SONY

3-751-608-22 (2)

Video Camera Recorder Hi8

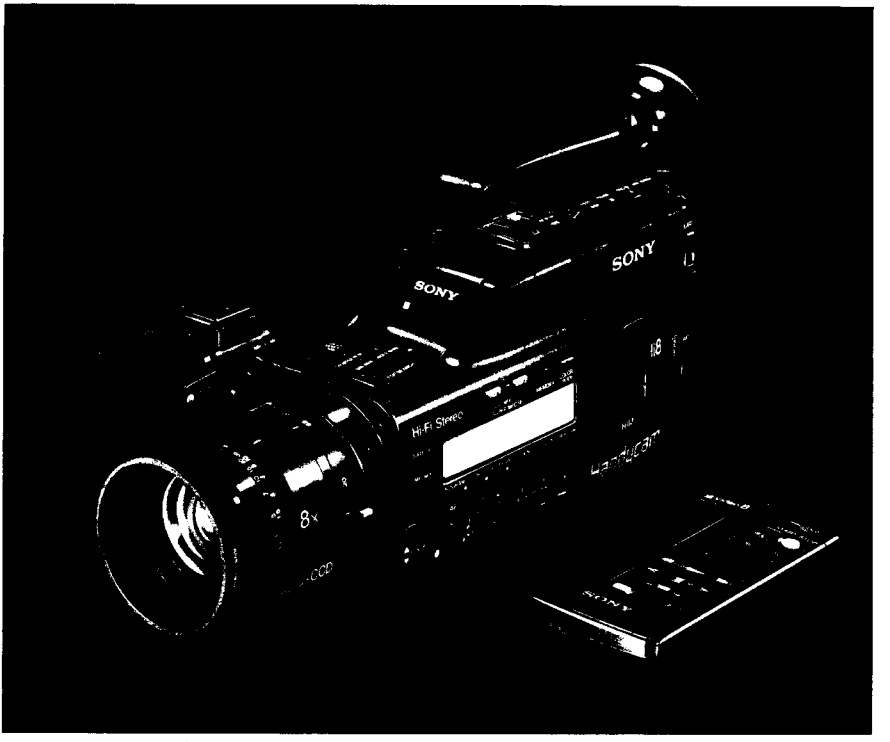
CCD-V101

Operating Instructions

Before operating the unit, please read this manual thoroughly and retain it for future reference.

PROPERTY OF THE
NATIONAL TECHNICAL INFO.

FILE COPY



video Hi8 Handycam

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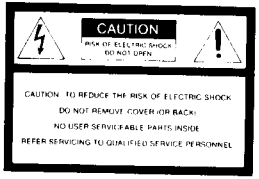
Owner's Record

The model and serial numbers are located on the bottom. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-V101 Serial No. _____

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

INFORMATION for the customers in the U.S.A.
This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna
Relocate the equipment with respect to the receiver
Move the equipment away from the receiver
Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

For the customers in Canada
This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

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Introduction

Overview of the CCD-V101

The CCD-V101 Video Hi8 handycam is a compact color video camera/recorder (camcorder). You can use it to shoot the pictures you want and play them back on your television set. It is equipped with a stereo recording system which offers high quality sound to match the Hi8 picture. The full featured camera section offers various camera adjustments to create just the kind of program you wish.

Who this Manual is for

This manual is designed for you. You can use this manual to find exactly the information you need, whether you are familiar with video equipment or not.

How this Manual is Organized

This manual consists of seven sections.
Section 1 explains the preliminary steps necessary to prepare for shooting and playback.
Section 2 explains the very basic techniques of shooting.
Section 3 explains how to playback the tape being shot in section 2.
Section 4 explains additional shooting techniques which will add flavor to your programs.
Section 5 explains the unique shooting techniques including the programmed AE mode and the manual mode.
Section 6 explains the techniques on how-to-edit your video programs.
Section 7 explains other useful information to enjoy the best of your camcorder.

If you have any problem during operation, see the "Trouble Checks" section.

If you are beginner, start with "Recording a picture using automatic adjustments." If you are very familiar with camcorder operation, also refer to "Operating the Camera Section (2) and (3)" for advanced shooting techniques.

How this Manual Works

Refer to the information below to help you follow the instructions in this manual.

- Controls and settings on the camcorder are shown in capital letters:
  ex. Set the POWER switch to CAMERA.
- The letter in an illustration corresponds to the letter in the text:
  ex. (A-1) or (B)
- The step numbers in an illustration correspond to the step numbers in the text.
- Notes and cautions are enclosed with lines.
  ex.

  Note on batteries
  Battery will not last as long in cold places.

Supplied Accessories

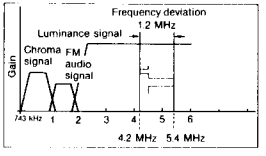
The camcorder is packed together with the following units. Check to see that everything is contained in the package.

- Wireless Remote Commander RMT-501 (1)
- Size AA (IEC designation R6) batteries for the Wireless Remote Commander (2)
- Battery pack NP-66H (1)
- AC power adaptor AC-V35/V35A (1)
- Lithium battery CR2025 (1)
- RFU adaptor RFU-90UC (1)
- A/V connecting cable (3 phono to 3 phono) (1)
- Video cable with S video connectors (4-pin mini DIN to 4-pin mini DIN) (1)
- Cassette tape (1)
- Shoulder strap (1)
- Jack covers* (1 set)
- Lens cap*

Item with an asterisk (*) is attached to the unit.

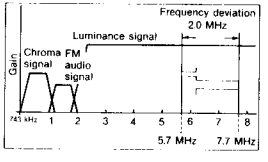
(A-1)

Frequency allocation of the standard 8 mm video system



(A-2)

Frequency allocation of the Hi8 video system



Technical Information

Hi8 (High Eight) Video System

The 8 mm video system employs a metal powder tape. This means the video camera recorder is capable of recording a large amount of information and enhances picture quality. Taking advantage of the 8 mm video system, the Hi8 video system has been developed. The main characteristics of the Hi8 video system are as follows:

Super High Quality Picture

(A-1), (A-2)

The information capacity is a key element for picture improvement. It can be increased by shifting up the FM carrier frequency range. In the Hi8 video system, the FM carrier frequency range of the luminance signal is shifted up to 5.7–7.7 MHz. This is higher than the 4.2–5.4 MHz range of the standard 8 mm video system. Thanks to this, the horizontal resolution is improved to more than 400 lines.

Use of High Grade Tape to Match the Hi8 Video System

Metal evaporated tape is ideal for video systems because it has large magnetic energy that allows for high-density recording. The Hi8 video camera recorder uses such high-grade tape for the Hi8 video system, covering a wide frequency range, to achieve a high-quality video signal for recording/playback.

S VIDEO (Separate Luminance/ Chrominance Signal) Input/Output Connectors

Conventionally, video equipment exchanges the composite video signal containing the luminance (Y) signal and the chrominance (C) signal mixed. The composite video signal is liable to produce interference resulting in picture quality loss. On the contrary, an S VIDEO connector transmits or receives the video signal separated into the luminance signal and the chroma signal. Flickers and color blur in the picture are minimized with the separated video signal, and sharpness is enhanced to such an extent that hair and fine stripes are clearly visible. The S VIDEO connector also assures an excellent editing quality with minimum picture quality loss.

Compatibility with Conventional Video Camera Recorders

A high-quality picture can be recorded and played back on a tape for the Hi8 video system.

Recording with this unit

Hi8 tape

MODE SET menu "Hi8" to "AUTO" ➡ Tape recorded in the Hi8 video system

MODE SET menu "Hi8" to "OFF" ➡ Tape recorded in the standard 8 mm video system

Standard 8 mm tape

Regardless of the "Hi8" setting in the MODE SET menu ➡ Tape recorded in the standard 8 mm video system

Playback with this unit

Tape recorded in the Hi8 video system

Tape recorded in the standard 8 mm video system

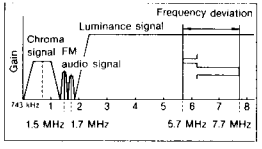
➡ The recording mode is selected automatically

- A tape recorded in the Hi8 video system cannot be played back with an conventional 8 mm video camera recorder.
- A standard 8 mm tape cannot be recorded in the Hi8 video system.
- A tape for the Hi8 video system cannot be recorded and played back in the Hi8 video system with a conventional video camera recorder.
- The recording tape speeds in the Hi8 video system are compatible with the conventional 8 mm format.
  Recording/playback time is 2 hours using a E6-120/P6-120 tape or the equivalent.

Cassette used	With this unit		
	Recording		Playback
	Hi8	Normal	
Standard 8 mm tape	No	Yes	Yes
Hi8 tape	Yes	Yes	Yes

(A-3)

Frequency allocation of the hi-fi system



Hi-Fi Stereo System

On the 8 mm video standard track the sound is recorded/played back in AFM hi-fi monaural. On this camcorder, an additional AFM hi-fi stereo sound can be recorded on the standard track.
The AFM hi-fi stereo sound is recorded as L+R on the 1.5 MHz carrier and L−R on the 1.7 MHz carrier in FM as illustrated. **(A-3)** This method was adopted to maintain compatibility with the conventional AFM hi-fi monaural sound.
When playing back the tape recorded in this hi-fi stereo system, a matrix circuit is used to produce the L and R stereo sounds separately. When a conventional AFM hi-fi monaural model is used to playback a tape recorded by this camcorder in AFM hi-fi stereo, the playback sound will be in a L+R monaural sound. This is because the monaural models will playback only the sound recorded in the 1.5 MHz carrier.
The AFM hi-fi stereo system of this camcorder enables you to enjoy a five stereo sound atmosphere.

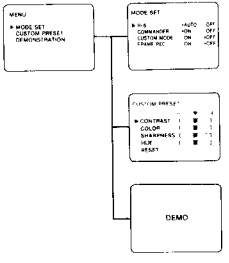
Compatibility with the conventional 8 mm video format

When you playback a tape recorded in AFM stereo hi-fi on a conventional 8 mm video equipment, the sound will be in monaural.

On the Menu System

The menu system of this camcorder enables setting and adjustments to further enjoy the features and functions. The menu is displayed in the viewfinder or on the TV screen if connected to a TV. The menu consists of two main parts, one for use during camera recording and the other for use during playback and editing. Refer to the following section for a quick overview of the two menus.

(B-1)



Menu System for Camera Recording

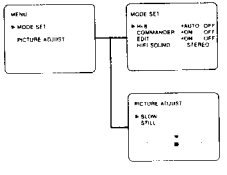
(B-1)

MODE SET
Various mode settings for camera recording is made in this menu.

CUSTOM PRESET
The camcorder can be adjusted to perform camera recording in the desired picture.

DEMONSTRATION
The camcorder automatically shows the manual mode, four programmed AE modes, each title mode, menu displays in sequence.

(B-2)



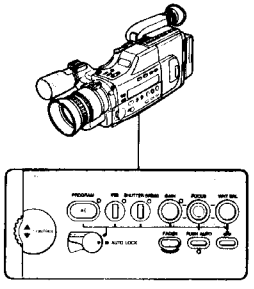
Menu System for Playback and Editing

(B-2)

MODE SET
Various mode settings for playback and editing are made in this menu.

PICTURE ADJUST
The playback picture can be adjusted to obtain maximum quality.

(C)



(C)

Various camera recording modes are available in this camcorder. Automatic adjustment of aperture, gain, white balance, focus, plus the locked shutter speed offers worry-free camera recording for the beginner. Manual adjustment of each of these parameters offers effective camera recording to meet different object and shooting conditions.
Plus, the programmed AE mode offers additional shooting techniques to enrich the creation of your video program.

Full Automatic Adjustment Mode

When the AUTO LOCK switch is set to AUTO LOCK, aperture, gain, white balance, and focus is automatically adjusted and the shutter speed is locked to the normal speed (1/60).

Manual Adjustment Mode

By setting the AUTO LOCK switch down, each parameter can be adjusted manually.

IRIS

- Each press of this button switches between automatic and manual adjustment.
- 15 aperture values (F1.4 to F16) plus aperture close can be selected using the CONTROL dial in the manual mode.

SHUTTER SPEED

- Each press of this button switches the shutter speed as follows:
  1/60 (No indication) → 1/100
  ↓
  1/1000 ←
- 27 shutter speeds (1/60 to 1/10000) can be selected using the CONTROL dial in the manual mode.

GAIN

- Each press of this button switches between automatic and manual adjustment.
- 8 gain levels (−3 dB to +18 dB) can be selected using the CONTROL dial in the manual mode.

Continued on the next page

FOCUS

- Each press of this button switches between automatic and manual focusing.

PUSH AUTO

- When pressed during manual focusing mode, automatic focusing is activated for the extension that the button is pressed.

WHT BAL

- Each press of this button switches the mode as follows:

Automatic (no indication) → (One-push adjustment) ↓ (Outdoors) ← (Indoors) ↑

(One-push white balance)

- When pressed during mode, the white balance can be adjusted manually.

Programmed AE Modes

By setting the AUTO LOCK switch down, four programmed AE modes can be selected to match distinctive camera recording conditions.

Portrait mode
Use to focus on the subject and to have the background out of focus. The aperture and shutter speed is automatically adjusted to maintain the appropriate exposure according to the size and brightness of the subject.

Sports mode
Use to shoot subjects moving at high speeds and then play it back clearly in slow or still. The aperture and shutter speed is automatically adjusted to maintain the appropriate exposure according to the speed of the subject.

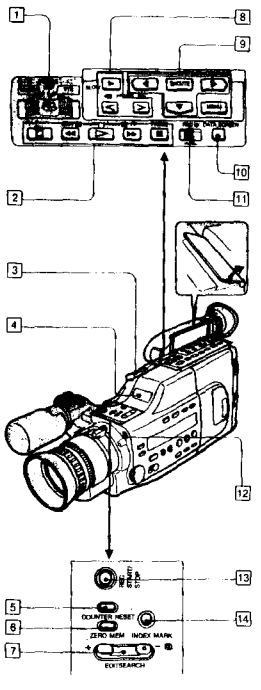
Aperture priority mode
Select the desired aperture (F1.4 to F16) with the CONTROL dial and the shutter speed will be automatically adjusted to maintain the appropriate exposure.

Shutter priority mode
Select the desired shutter speed (1/60 to 1/10000) with the CONTROL dial and the aperture will be automatically adjusted to maintain the appropriate exposure.

Note
Focus and white balance can either be adjusted automatically or manually during the programmed AE mode. The adjusting method is same as those in the "Manual Adjustment Mode."

Identifying the Parts

(D-1)



(D-1)

For details of the use of each parts, refer to the pages indicated.

[1] **POWER switch**
CAMERA: for camera recording
VTR: for playing back or editing tapes
OFF: power off

[2] **Tape transport buttons ●, ●**
■ (stop)
◀◀ REW (rewind)
▷ (playback)
▶▶ FF (fastforward)
❚❚ PAUSE

[3] **Power zoom button ●**

[4] **Remote control sensor ●**

[5] **COUNTER RESET button ●, ●, ●**

[6] **ZERO MEM (memory) button ●, ●, ●**

[7] **EDITSEARCH (and recording review) buttons ●**

[8] **Tape transport buttons ●**
❚▶ SLOW (slow speed playback)
< ◀❚❚/❚❚▶ > (direction switch/frame-by-frame playback)

[9] **Menu operation buttons ●, ●**
MENU
EXECUTE
◀/▶/▼

[10] **DATA SCREEN button ●**

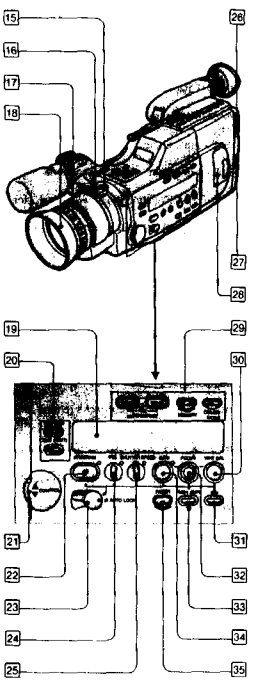
[11] **● REC (recording) switch ⊕**
Slide in the direction of the arrow.

[12] **Tally lamp ⊕**
Lights during camera recording. Blinks when the battery is exhausted, or the tape reaches its end.

[13] **REC (recording) START/STOP button for low position camera recording ●**
Use this button instead of the START/STOP button for low-position recording.

[14] **INDEX MARK button ●, ●**

(D-2)



(D-2)

[15] **Macro set button (green) ●**

[16] **Zoom lever ●**

[17] **Focus ring**

[18] **Lens hood ●**

[19] **Display window ●**

[20] **DATE (+)/TIME (NEXT) buttons ●, ●**

[21] **CONTROL dial ●**
Move up or down to select the desired parameters during programmed AE mode and manual adjustment mode.

[22] **PROGRAM AE (programmed auto exposure) button ●**

[23] **AUTO LOCK switch**
To adjust the aperture, gain, focus, white balance automatically and the shutter speed locked to 1/60, set to AUTO LOCK.

[24] **IRIS button**

[25] **SHUTTER SPEED button**

[26] **EJECT (cassette eject) button ●**

[27] **BATT (battery eject) knob ●**

[28] **Cassette holder**

[29] **SUPERIMPOSE buttons ●**
TITLE 1 button
TITLE 2 button
MEMORY button
COLOR/MODE button

[30] **WHT BAL (white balance) button ●**

[31] **(one-push white balance) button ●**

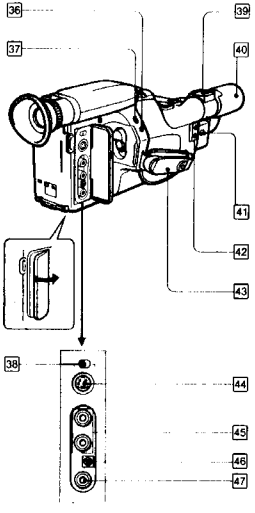
[32] **FOCUS button ●**

[33] **PUSH AUTO button ●**

[34] **GAIN button**

[35] **FADER button ●**

(D-3)



(D-3)

36 🎧 **(headphones) jack (stereo mini jack)**

37 **REMOTE connector (stereo mini-minijack)**
Connect a wired remote control unit, a editing controller (not supplied), etc.

38 **IN/OUT (signal input/output) selector** ●, ⓫

39 **Accessory shoe**
Attach a video light, external microphone, (not supplied) etc.

40 **Built-in one-point stereo microphone**

41 **BUILT-IN MIC (microphone)/WIND selector** ●

42 **EXT MIC and DC OUT (microphone power output) jack**
Connect an external microphone (not supplied).
The MIC jack accepts Sony "plug-in-power" type microphone and the DC OUT jack supplies power to it.

43 **Grip strap** ●

44 **S VIDEO connector (4-pin mini DIN connector)**

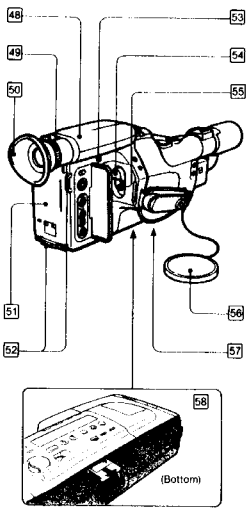
45 **AUDIO L/R input/output jacks (phono jacks)** ●, ⓫

46 **RFU DC OUT (RFU adaptor DC output) jack (special minijack)** ●
Attach the supplied RFU adaptor here.

47 **VIDEO input/output jack (phono jack)** ●, ⓫

About the (LANC) mark
(LANC) stands for Local Application Control Bus System. The (LANC) connector is used for controlling the tape transport of video equipment and peripherals connected to it. This connector has the same function as the connectors indicated as CONTROL L or REMOTE.

(D-4)



(D-4)

48 **Viewfinder**
The picture being recorded or played back can be monitored in black and white in here.
Caution indicators, tape operation modes, function modes, menu are also displayed.

49 **Viewfinder lens adjustment ring** ●

50 **Eyecup**

51 **Battery mounting surface** ●

52 **Hooks for shoulder strap**

53 **PUSH SLIDE button**
Press this button and slide the viewfinder to the desired position.

54 **STANDBY switch**
Slide up to set the camcorder to the standby mode.

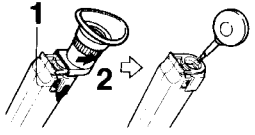
55 **START/STOP button**
Press to start and stop camera recording.

56 **Lens cap**

57 **Tripod receptacle (bottom)**

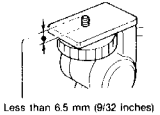
58 **Lithium battery compartment (bottom)** ●

(D-5)



To remove the dust from inside the viewfinder (D-5)
Detach the eyecup as illustrated and clean the surface of the screen with a blower.

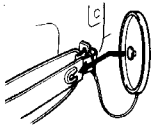
(D-6)



Less than 6.5 mm (9/32 inches)

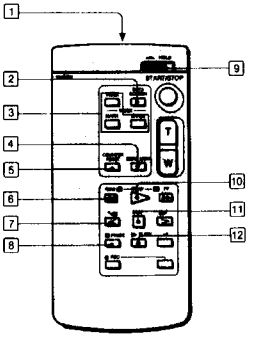
Note on attaching a tripod (D-6)
When attaching a tripod other than Sony's, make sure that the length of the camera mounting screw is less than 6.5 mm (9/32 inches). Otherwise, the screw may damage the inner parts of the camcoder.

(D-7)



When the lens cap is removed (D-7)
Attach the lens cap to the grip strap.

(D-8)



Wireless Remote Commander

(D-8)

You can record or play back a tape from a distance. The buttons on the Commander with the same name or mark as those on the camcorder have the same function. The buttons with an asterisk (*) is available on the Commander only.

When you use the Commander
Be sure to select "COMMANDER ON" in the MODE SET menu (page 40 and 59) and then start operating the camcorder. Point the Commander to the remote sensor on the camcorder.

1 **Transmitter**

2 **DATA SCREEN button** ●

3 **INDEX buttons** ●, ●
INDEX button*
INDEX MARK button
INDEX ERASE button*

4 **ZERO MEM (memory) button** ●, ●, ●

5 **COUNTER RESET button** ●, ●, ●

6 **◀◀ REW (rewind) button** ●

7 **</◀▮▮ (reverse direction/reverse frame) button** ●

8 **▮▮ PAUSE button** ●

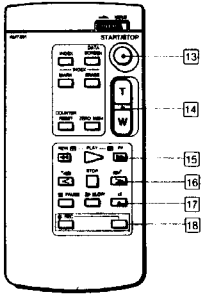
9 **HOLD switch***
Slide in the direction of the arrow to prevent the buttons from being accidentally depressed.

10 **▷ PLAY button** ●

11 **■ STOP button** ●

12 **▮► SLOW button** ●

(D-9)



(D-9)

13 **START/STOP button**
Press to start and stop camera recording.

14 **Power zoom button ●**

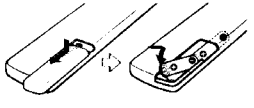
15 **▶▶ FF (fast forward) button ●**

16 **>/II▶ (forward direction/forward frame) button ●**

17 **X 2 button* ●**
Provided only on the Commander.

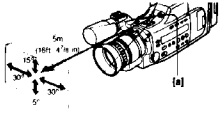
18 **Recording buttons ●●**
Press both buttons simultaneously when recording from another equipment.

(D-10)



Inserting batteries
(D-10)
Insert two size AA (R6) batteries with polarity positioned correctly.

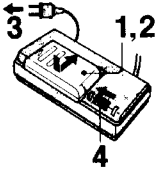
(D-11)



Remotely controllable range
(D-11)
Point the Commander towards the remote sensor. **[a]**

Notes on batteries
- The batteries will last for about six month under normal operation. However, if the Commander will not be used for a long period, remove the batteries to avoid possible damage from battery leakage.
- Do not let direct sunlight or strong light source light the camcorder's remote control sensor. Remote control with the Commander may not be effective.
- The command mode of the Commander is VTR 2. Avoid using Sony VCRs with the same command mode at the same time.

(E-1)



Connecting the Power Sources

First Choose the Power Source

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-66H (supplied), NP-77H NP-77, or NP-55
	Alkaline batteries	Battery case EBP-55
Indoors	House current	AC power adaptor AC-V35/V35A (supplied), AC-V30, or AC-V55
In the car	12 V or 24 V car battery	DC pack DCP-55, or AC power adaptor AC-V55 and car battery cord DCC-16AW

Note on power sources
Disconnecting the power source or removing the battery pack during recording or playback may damage the inserted tape. If disconnected, supply the power again immediately.

Using the Battery Pack

Step 1
Charge the battery pack. **(E-1)**

1 Align the groove on the battery pack with those on the AC power adaptor.

2 Slide in the battery pack to the right as illustrated.

3 Connect the AC power adaptor to a wall outlet.

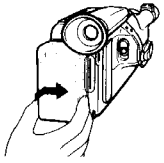
4 Set the CHARGE/VTR selector to CHARGE.

	NP-66H (supplied)	NP-55	NP-77	NP-77H
Required charging time	100	60	120	140

(approx. minutes using AC-V35/V35A)

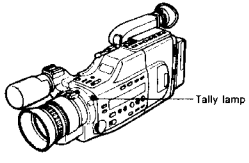
Refer to the operating instructions of the AC power adaptor for details.

(E-2)

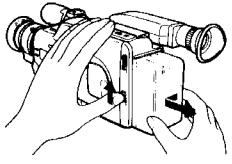


(E-3)

(E-4)



(E-5)



Step 2
Mount the battery pack on the camcorder. **(E-2)**

1 Align the right side of the battery pack with the line on the camcorder.

2 Slide in the battery pack to the right as illustrated.

Notes
- Make sure that the battery fits completely on the mounting surface of the camcorder. Imperfect mounting may damage the projections of the camcorder.
- If your nose touches the battery pack, adjust the position of the viewfinder by sliding it while pressing PUSH SLIDE.

Battery life
A fully charged battery pack lasts for:

	NP-66H (supplied)	NP-55	NP-77	NP-77H
Battery life	75	40	80	100

(approx. minutes continuous recording when used indoors)

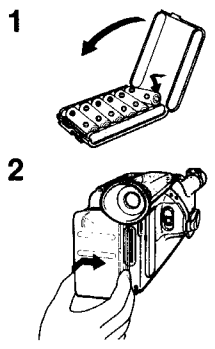
When the battery becomes weak, the indication and the red lamp in the viewfinder **(E-3)** and the tally lamp **(E-4)** blinks. Replace the battery pack with a fully charged one.

To remove the battery pack
(E-5)
Hold the BATT knob up, and slide the battery pack to the left.

Other options
- AC-V55 AC power adaptor:
  You can charge two battery packs.
- BC-55, BC-77 portable battery charger:
  You can charge a battery pack on 100 – 240 V AC.
- DC-V30 car battery pack:
  You can charge a battery pack by connecting the car battery charger to the cigarette lighter socket.

If you have an NP-4000
You can use it for long outdoor recording.

(E-6)



Using Alkaline Batteries

(E-6)

The EBP-55 battery case (not supplied) is required.

1 Insert size AA (R6) alkaline batteries into the battery case.

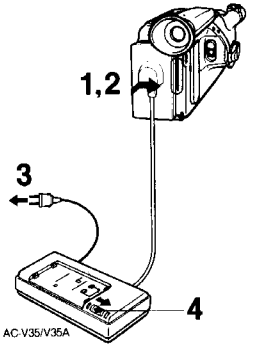
2 Attach the battery case in the same way as the battery pack.

Battery life when using alkaline batteries
Approximately 40 minutes under continuous recording indoors.

To remove the battery case
Proceed in the same manner as the battery pack.

Notes on battery life while using the battery case
- Batteries does not last long in cold places.
- No indication appears in the viewfinder to warn of a weak battery.

(E-7)



Using the House Current

(E-7)

The supplied AC-V35/V35A AC power adaptor is required.

1 Align the right side of the connecting plate with the line on the camcorder.

2 Slide in the connecting plate to the right.

3 Connect the AC power adaptor to a wall outlet.

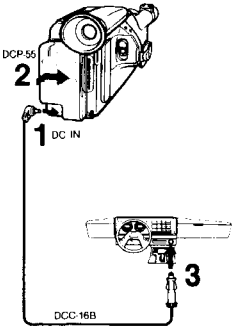
4 Set the CHARGE/VTR selector on the AC power adaptor to VTR.

See the operating instruction of the AC power adaptor for further information.

To remove the connecting plate
Proceed in the same manner as the battery pack.

Other power sources
The AC-V30 or AC-V55 AC power adaptor can also be used.

(E-8)



Using the Car Battery

(E-8)

The DCP-55 DC pack (not supplied) is required.

1 Insert the DCC-16B car battery cord, supplied with the DCP-55 DC pack into the DC IN jack on the DC pack.

2 Align the right side of the DC pack with the line on the camcorder and slide it to the right.

3 Connect the DCC-16B car battery cord to the cigarette lighter socket of a car (12 V or 24 V).

To remove the DC pack

Proceed in the same manner as the battery pack.

Other options

The AC-V56 AC power adaptor and the DCC-16AW car battery cord can also be used to operate this camcorder on a 12 V or 24 V car battery.

Using the Best of the Battery Pack

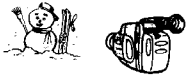
How to prepare the rechargeable battery packs

Have a sufficient battery pack power to perform 2 or 3 times as much recording than you have planned.

"Battery life" as indicated in the instruction manual or catalogue of the camcorder is measured by the continuous recording time of the camcorder, placed at a room temperature using a full-charged battery.

Battery life is shorter in a cold climate.

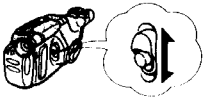
Battery efficiency is decreased and the battery will be used up more quickly.



Turn the STANDBY switch of the camcorder off when not recording to save battery power.

A smooth recording can be made even if recording is stopped and started again.

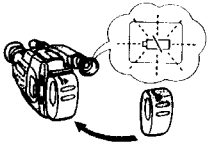
While positioning the subject, selecting an angle, or looking through the viewfinder, the lens moves automatically and the battery is used. The battery is also used when a tape is inserted or removed.



When the rechargeable battery pack should be replaced

When the ◁▷ mark in the viewfinder changes from slow blinking to rapid blinking while you are recording.

Turn off the power switch of the camcorder and replace the battery pack. Leave the tape in the camcorder in order to obtain a smooth recording after the battery pack is replaced.

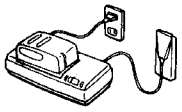


Notes on charging

Before using the battery pack, charge it sufficiently. A brand-new battery pack is not charged.

Recharge the battery pack when it is exhausted.

- If recording is completed before the ⏍ mark appears in the viewfinder, it is recommended that you remove the tape, set POWER to CAMERA, slide up STANDBY, and leave the camcorder until the ⏍ mark blinks rapidly.
- Repeated charging while some capacity remains causes a lowering of battery capacity. However, the original battery capacity can be recovered if you fully discharge and fully charge the battery again.



Recharge the battery pack before using.

If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged.
Charge it again but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Keep the terminals clean

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.

When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This will improve the contact condition. Also wipe the + and − terminals with a soft cloth or paper.

Notes on the rechargeable battery pack

Why the battery pack heats up

During charging or recording, the battery pack heats up. This means energy has been generated and a chemical change has occurred inside the battery pack, but this is not dangerous.

How to care for the battery pack

- Remove the battery pack from the camcorder after using it, and keep it in a cool place.
  When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder even if the POWER switch is turned off. It causes overdischarging and will shorten battery life.
- The battery pack is always discharging even when it is not in use after charging. Thus, it is recommended you charge the battery before using.

How to use the switch on the battery pack

This switch is provided so that you can remember the charging condition. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up.

How many times can the battery pack be recharged

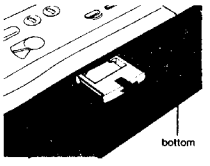
It can be fully charged and discharged about 500 times under normal temperatures. If the ⏍ mark blinks rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Temperature during charging

Lower temperature require a longer charging time. Charging under temperatures ranging from 10°C to 30°C (50°F to 86°F) is recommended.

(F-1)

1



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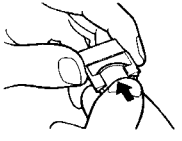
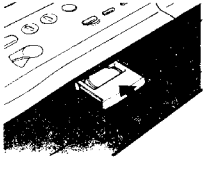


3



Setting the Date and Time

Inserting the Lithium Battery

(F-1)

This camcorder uses a lithium battery to activate the clock and to keep the titles in the memory.
Install the supplied lithium battery before operating it for the first time.

1 Pull out the lithium battery holder from the bottom of the camcorder.

2 Install the supplied CR2025 lithium battery with the + side facing the other side.

3 Install the lithium battery holder to the bottom of the camcorder.

To remove the lithium battery

Pull out the lithium battery holder from the bottom of the camcorder and pull out the lithium battery.

Note on battery life

The battery lasts for approximately 1 year under normal operation. When the lithium battery becomes weak, the time indication keeps blinking in the display window and blinks in the viewfinder for about 5 seconds when the POWER switch is set to CAMERA. **In this case, replace the lithium battery with a Sony CR2025 or a Duracell DL-2025. Use of other batteries may present a risk of fire or explosion.** After replacing the lithium battery, readjust the date and time. If the battery pack or other power sources were attached during lithium battery exchange, readjustment is not necessary.

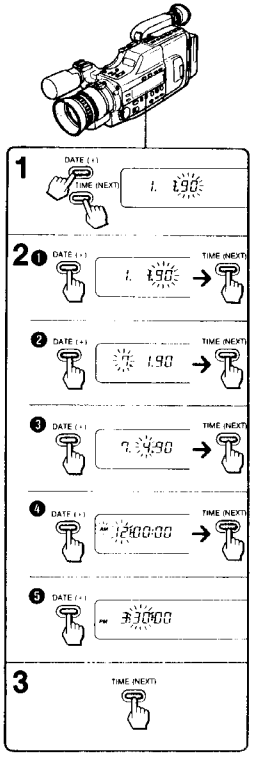
Cautions

- Keep the lithium battery out of the reach of children.
  Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.

WARNING

Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

(F-2)



Setting the Date and Time

(F-2)

Before you begin

- Check that a power source is installed to the camcorder.
- Set the POWER switch to CAMERA and slide the STANDBY switch up.

Operation

1 **Press DATE (+) and TIME (NEXT) simultaneously for more than 3 seconds.**
The date indication blinks in the display window. The DATE button now functions as + (advance the number) and the TIME button functions as NEXT (execute). If you went passed the desired number, keep pressing the + button. The number eventually returns to the original one.

2 **Adjust the year ❶, month ❷, day ❸, hour ❹, and minute ❺ in this order.**
First, adjust the blinking digits with +, and then press NEXT.

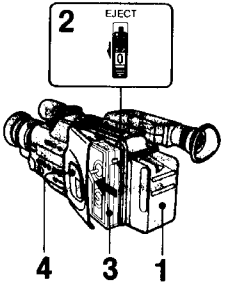
3 **Press NEXT to set the seconds to "00".**
The clock starts operating.

To correct date and time setting
Repeat steps 2 and 3.

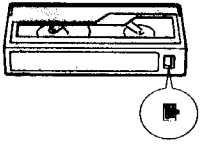
To advance the digits faster
Keep pressing +.

To check the preset date and time
Press DATE or TIME. When you press the same button again, the indication is cleared.

(G-1)



(G-2)



(G-1)

1 **Check that a power source is installed.**

2 **Press and slide the EJECT button.**
The cassette holder automatically opens. Do not open it forcibly while it is moving.

3 **Insert a cassette with the window facing outside.**

4 **Press the PUSH mark to close the cassette holder.**

Ejecting the Tape

1 **Check that a power source is installed.**

2 **Press and slide the EJECT button.**
The cassette holder automatically opens.

3 **Take out the tape.**

4 **Press the PUSH mark to close the cassette holder.**

Preventing Accidental Erasure

(G-2)

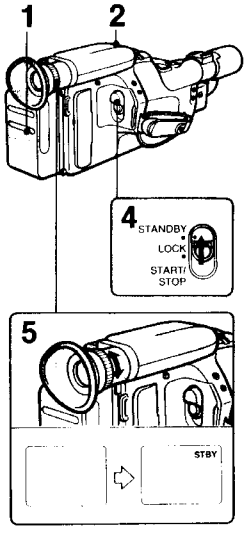
Slide out the red tab on the cassette to prevent recording. To re-record on the same tape, slide the tab in.

Notes on cassette handling

- Never insert anything in the small holes on the rear of the cassette. These holes are used to sense the type and thickness of the tape, or if the tab is out or in, etc.
- Store tapes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

Adjusting the Viewfinder Lens

(H)



(H)

The position of the viewfinder lens for optimum vision varies depending upon the person. Adjust it when using the camcorder for the first time, or when using it after someone else.

1 **Check that a power source is installed.**

2 **Hold down the green button and slide the POWER switch to CAMERA.**

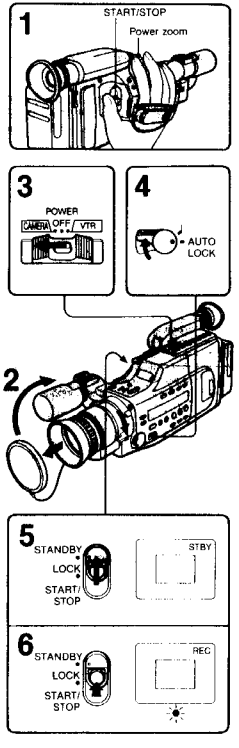
3 **Insert a cassette.**

4 **Slide the STANDBY switch up.**

5 **Turn the viewfinder lens adjustment ring so that the "STBY" indication in the viewfinder comes into focus.**

Recording a Picture with the Automatic Adjustments

(I-1)



(I-1)

Before recording "once-only" events, we strongly recommend making a trial recording and checking that everything is working perfectly.

1 **Hold the camcorder as illustrated.**
Put your hand through the grip strap and check that your thumb easily touches the START/STOP button.

2 **Remove the lens cap.**

3 **Hold down the green button and slide the POWER switch to CAMERA.**

4 **Set the AUTO LOCK switch to AUTO LOCK and turn the zoom lever downwards.**

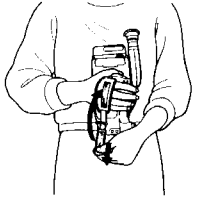
5 **Slide the STANDBY switch up.**
"STBY" and the auto-focus frame appear in the viewfinder. The camcorder is now set to the recording standby mode. The automatic focusing functions within the objects inside the auto-focus frame. Do not turn or stop the focus ring forcibly.

6 **Press the START/STOP button.**
"REC" appears and the red lamp lights in the viewfinder. The camcorder is recording.

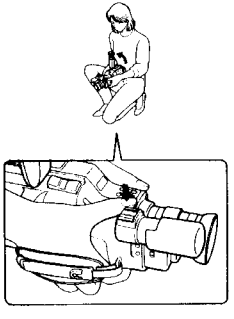
To stop recording momentarily
Press the START/STOP button again. The camcorder enters the standby mode with "STBY" indication in the viewfinder.

To stop recording
Slide the STANDBY switch down and set the POWER switch OFF.

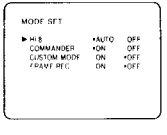
(I-2)



(I-3)



(I-4)



How to fix the grip strap
(I-2)
In step 1 on the previous page, hold the camcorder pressed to your body and pull the grip strap upwards.

For low-position shooting
(I-3)
The viewfinder can be turned up 90 degrees. Press the REC START/STOP button in the front of the camcorder instead of the START/STOP button to start and stop the camera recording.

How to record in the Hi8 mode
(I-4)
The camcorder is set to record in the AUTO mode which automatically records in the Hi8 mode when a Hi8 tape is used. To record in the standard mode with the Hi8 tape change the setting in the menu.
See "Using the Menu during Camera Recording" on page 40. On the playback compatibility of Hi8 tape and standard tape refer to page 7.

Notes on recording
- To record from the beginning of the cassette, run the tape for about 15 seconds before recording. This will avoid missing the starting point when the tape is played back.
- If the POWER switch is moved during recording, the tape will stop.
- When moving from indoors to outdoors, or vice versa, slide the STANDBY switch up and point the camcorder at a white object for about 15 seconds so that the white balance is properly adjusted.

Note on standby mode
If you leave the camcorder in the standby mode for 5 minutes or more, the camcorder will automatically be turned off. To resume the standby mode, slide the STANDBY switch down once and slide it up again. To start recording, press the START/STOP button.

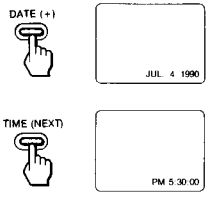
Notes on light sources
- A vertical band may appear when a subject such as a candle flame or a light is shot against a dark background.
- If you shoot an object under bright lighting conditions just after shooting in a dark place, the picture may not appear in the viewfinder. In this case, point the camcorder to another direction.

Brightness Levels

The single greatest influence on picture quality is the brightness level. Using the following chart as a reference, take a few minutes to familiarize yourself with brightness levels to improve your recording.

	Unit: lux	ND filter recommended
Snow-covered mountains Snow fields Sandy beach, clear day in summer		
Clear day, mid-day (100,000)	100,000	
Clear day, mid-afternoon (35,000) Overcast day, mid-day (32,000)		
	10,000	
Overcast day, one hour after sunrise (2,000) Office lit by fluorescent lamps, near window (1,000)	1,000	
Clear day, one hour before sunset (1,000) Department store counter (500 – 700)		Normal Recording
Station wicket (650) Office lit by fluorescent lamps (400 – 500)	500	
Room lit by two 30 W fluorescent lamps (300)	300	
Subway station platform (300)		
Arcade at night (150 – 200)	100	
Theater lobby (15 – 35) Candlelight (10 – 15)		Video light recommended
	10	

(I-5)



To Record Date and Time

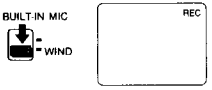
(I-5)

1 Set the camcorder in the camera recording standby or camera recording mode.

2 Press the DATE button to indicate the date and TIME button to indicate the time.
The date or time displayed in the viewfinder will be recorded together with the picture.

To stop recording date or time
Press the DATE or TIME button. The indication is cleared and the recording continues.

(I-6)

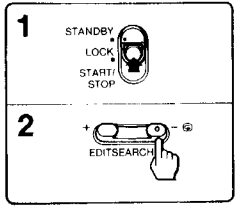


When there is Strong Wind

(I-6)

Set the BUILT-IN MIC selector to WIND.
The noise resulting from the wind will be reduced.
After recording, set it to the upper (green) position.

(I-7)



To Check the Last Portion of the Recording

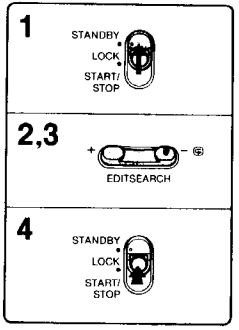
(I-7)

1 Set the camcorder in the recording pause mode by pressing the START/STOP button.

2 Press the ⊖ side of the EDITSEARCH button.
The last few seconds of the recorded portion is rewound and then is played back in the viewfinder. After a few seconds of playback, the camcorder returns to the recording pause mode.

If the picture was not recorded
the video heads may be contaminated. Clean the heads using the Sony V8-25CLH video head cleaning cassette or the equivalent.

(I-8)



To Re-record on a previously Recorded Portion

(I-8)

1 Slide the STANDBY switch up.
The camcorder enters the standby mode.

2 Look in the viewfinder and search for the point from where you want to begin the recording.
Keep pressing the + side of the EDITSEARCH button to advance the picture at a normal playback speed or the – side to reverse the picture.

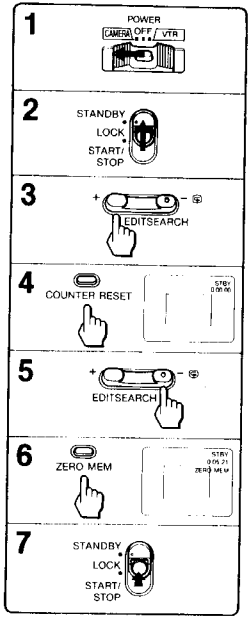
3 At the desired point, release the EDITSEARCH button.

4 Press the START/STOP button to start recording.

As long as the tape is not removed, the re-recorded picture will be smoothly connected even if the STANDBY switch is slid down and slid up again, or the power is turned off and on.

To stop recording
Slide the STANDBY switch down.

(I-9)



To Re-record a Picure in the Middle of a Recorded Tape (Insert Recording)

(I-9)

1 Hold down the green button and slide the POWER switch to CAMERA.

2 Slide the STANDBY switch up.
The camcorder enters the recording standby mode.

3 While looking in the viewfinder, keep pressing the + or – side of the EDITSEARCH button and release it at the point where the insertion should end.

4 Press the COUNTER RESET button.
The counter is reset to "0:00:00".

5 While looking in the viewfinder, keep pressing the – side of the EDITSEARCH button and release the button at the point where the insertion should start.

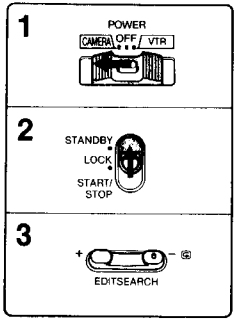
6 Press the ZERO MEM buttton.
The insert end point is stored in the memory.

7 Press the START/STOP button.
Insert recording starts. It stops automatically around the counter zero point.

To change the end point of the edit
Press the ZERO MEM button so that the ZERO MEM indication disappears. Start from step 3.

Note
The picture may be distorted at the end of the inserted portion when it is played back.

(I-10)



Playing Back the Picture Instantly

(I-10)

You can check the recorded picture in the viewfinder. The sound is not heard.

1 Hold down the green button and slide the POWER switch to CAMERA.

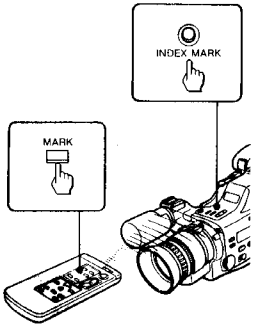
2 Slide the STANDBY switch up.

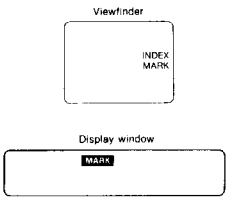
3 Keep pressing the + or – side of the EDITSEARCH button to playback the picture.
+ side: To view the playback picture.
– side: To view the playback picture in reverse.

To stop playback
Release the EDITSEARCH button.

To monitor the sound while viewing the playback picture in the viewfinder
1 Connect the headphones to the Ω jack.
2 Hold down the green button and slide the POWER switch to VTR.
3 Press ◀◀ to rewind the tape and press ■ where you want start playing back.
4 Press ▷ to start playback.

(J-1)





Marking Index Signals

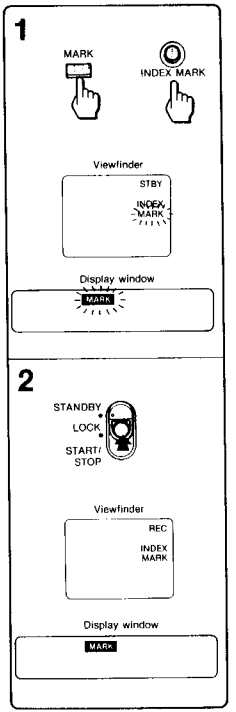
The beginning of the desired program can be located easily by marking an index signal and searching for it later.

To Mark an Index Signal during Camera Recording

(J-1)

Press the INDEX MARK button on the camcorder or the Commander at the point you wish to locate later.
The INDEX MARK indication appears in the viewfinder and MARK appears in the display window to indicate that the index signal has been marked.

(J-2)



To Mark an Index Signal at the Beginning of Camera Recording

(J-2)

1 **Press the INDEX MARK button on the camcorder or the Commander after setting the camcorder in the camera recording standby mode.**
The INDEX MARK indication appears in the viewfinder with MARK blinking and MARK blinks in the display window.

2 **Press the START/STOP button to release the camera recording standby mode.**
The MARK indication stops blinking to indicate that the index signal has been marked.

For other operations using the index signal
See page 54.

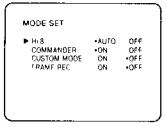
Notes
- The index signals can be marked at any desired point. But make sure there is more than 2 minutes of space between two index signals. If there is more than one index signal marked within an interval of 2 minutes on a normal tape run, the unit may not function properly.
- The INDEX MARK indication disappears automatically.
  Continue to record until the INDEX MARK disappears so that the recorded index signal can be searched correctly in the playback mode.

When the POWER switch is set to VTR, the index signal can also be marked during recording.
If the REC switch is pressed to start recording in the stop mode, an index signal will be automatically marked at the begining of the tape.

Using the Menu during Camera Recording

MODE SET menu, CUSTOM PRESET menu, and DEMONSTRATION menu can be used during camera recording. In the MODE SET menu, various settings to further enjoy the features of the camcorder can be selected. In the CUSTOM PRESET menu, the camcoder can be set to record in the desired picture tone. In the DEMONSTRATION menu, the camcorder displays the various indications and the operations available.

(K-1)



MODE SET Menu

(K-1)

Hi8 AUTO/OFF

- Select AUTO to set the recording mode (Hi8 or normal) automatically depending upon the tape being used.
- Select OFF if you wish to record in the normal mode regardless of the type of tape being used.

COMMANDER ON/OFF

- Select ON when using the supplied Commander for camera recording.
- Select OFF when the supplied Commander will not be used for camera recording.

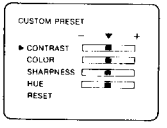
CUSTOM MODE ON/OFF

- Select ON to perform camera recording based on the setting made in the CUSTOM PRESET menu. See page 111.
- Select OFF to perform camera recording without the setting made in the CUSTOM PRESET menu.

FRAME REC ON/OFF

- Select ON to perform frame recording. See page 73.
- Select OFF when frame recording will not be performed.

(K-2)



(K-3)

CUSTOM PRESET Menu

(K-2)

The camera can be preset to record in the desired picture using the CUSTOM PRESET menu. The items that can be preset are CONTRAST, COLOR, SHARPNESS, and HUE. See "Custom Preset Function" on page 111 for details.

DEMONSTRATION Menu

(K-3)

The camcorder will automatically demonstrate the manual modes, programmed AE modes, title modes, MODE SET menu for camera recording, and the CUSTOM PRESET menu. The sequence can be monitored in the viewfinder or on a TV screen if connected.

Operation

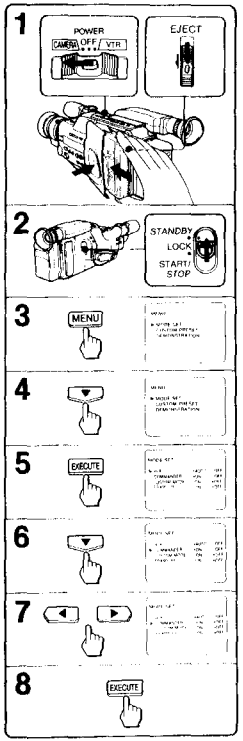
1 **Store 2 titles in the memory referring to pages 75 to 78.**

2 **To monitor the sequence on the TV screen, connect the camcorder and the TV referring to pages 43 to 46 and press DATA SCREEN.**

3 **Call up the MENU display and select DEMONSTRATION referring to page 42.**

4 **To get out of the DEMONSTRATION menu, press ◀, ▶, or ▼.**
To return to the MENU display, press MENU.

(K-4)



How to Call Up the Menu Display

(K-4)

Press the DATA SCREEN button to display the menu on the TV screen.

Example: To select COMMANDER OFF.

1 Set the POWER switch to CAMERA and insert a cassette.

2 Slide the STANDBY switch up.

3 Press the MENU button.
The MENU display appears.

4 Press ▼ and move cursor to the desired item.

5 Press the EXECUTE button.
The selected menu appears.

6 Press ▼ and move cursor to the desired item.

7 Press ◀ or ▶ to select the desired setting.

8 Press the EXECUTE button.
The setting is stored in the camcorder and the menu display is cleared.

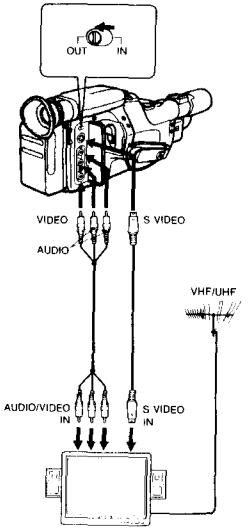
The setting is stored in the memory even if the POWER switch is set to OFF or the battery pack is removed, as long as the lithium battery is installed.

To display another menu
Start from step 1 in "How to Call Up the Menu Display."

To return to the original screen
Press the MENU button.

To make multiple settings within one menu
After step 7 in "How to Call Up the Menu Display", press ▼ and move cursor to the desired item.

(L-1)



To view the playback picture on the TV screen, the camcorder and TV and/or the VCR must be connected properly. Check the following connecting examples and go to the appropriate section to make the connections required.

Case 1: Connecting the camcorder to a TV with video/audio input jacks.
Case 2: Connecting the camcorder to a TV without video/audio input jacks.
Case 3: Connecting the camcorder to a TV via a VCR that has an input selector.
Case 4: Connecting the camcorder to a TV via a VCR that does not have an input selector.

Case 1: Connection to a TV with Video/ Audio Input Jacks

(L-1)

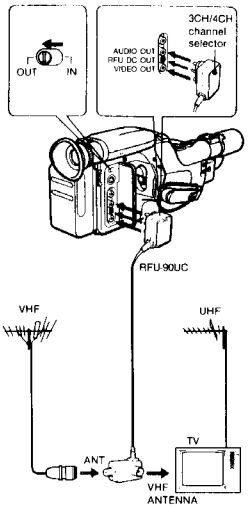
1 Connect the camcorder and the TV using the supplied AV connecting cable.
- *If your TV has an S video input jack,* connect the S VIDEO jack on the camcorder and the S video input jack on *the TV using the supplied S VIDEO* connecting cable.
- If your TV is a monaural type, connect *only the white plug for audio* on the TV.

2 Set the IN/OUT selector on the camcorder to OUT.

3 Set the TV/VTR selector on the TV to VTR.

Note
Refer to the operating instructions of the TV.

(L-2)



Case 2: Connection to a TV without Video/Audio Input Jacks

(L-2)

Step 1
Connecting the camcorder, the RFU adaptor (RFU-90UC, supplied), and the TV.

1 Connect the RFU adaptor to the camcorder.

2 Connect the VHF antenna and the RFU adaptor (supplied).

3 Connect the RFU adaptor to the TV.

4 Set the IN/OUT selector on the camcorder to OUT.

Step 2
Selection of the TV channel to monitor the camcorder playback.

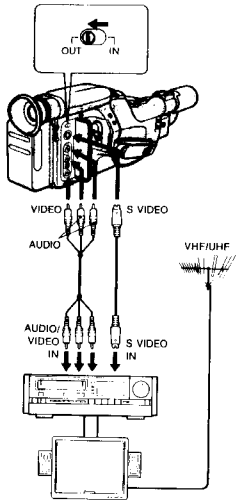
1 Set the RF unit selector on the RFU adaptor to either channel 3 or 4, whichever is not active in your area.

2 Select the same channel on the TV.

Step 3
Whenever playing back a tape, be sure to set the TV to the channel that you have selected in step 2.

Note
In this connection, the sound will be in monaural.

(L-3)



Case 3: Connection to a TV via a VCR with an Input Selector

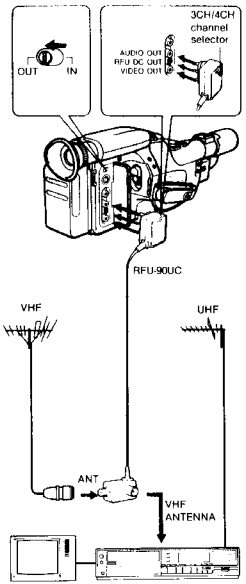
(L-3)

1 Connect the camcorder to the VCR using the supplied AV connecting cable.
- If your VCR has an S video input jack, connect the S VIDEO jack on the camcorder and the S video input jack on the VCR using the supplied S VIDEO connecting cable.
- If your TV is a monaural type, connect only the white plug for audio on the TV.

2 Set the IN/OUT selector on the camcorder to OUT.

3 Set the input selector on the VCR to LINE and set the TV/VTR selector on the TV to VTR.

(L-4)



Case 4: Connection to a TV via a VCR without an Input Selector

(L-4)

Step 1
Connecting the camcorder, the RFU adaptor (RFU-90UC, supplied), and the VCR.

1 **Connect the RFU adaptor to the camcorder.**

2 **Connect the VHF antenna and the RFU adaptor.**

3 **Connect the RFU adaptor to the VCR.**

4 **Set the IN/OUT selector on the camcorder to OUT.**

Step 2
Selection of the channel to monitor the camcorder playback.

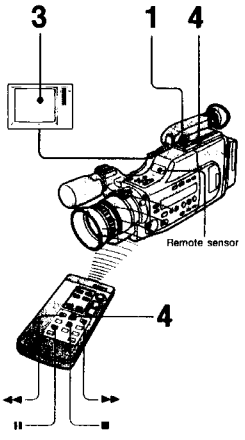
1 **Set the RF unit selector on the RFU adaptor to either channel 3 or 4, whichever is not active in your area.**

2 **Select the same channel on the VCR.**

Step 3
Whenever playing back a tape, be sure to set the VCR to the same channel that you have selected in step 2.

Note
In this connection, the sound will be in monaural.

(M-1)



Playing Back a Tape

Use the buttons on the camcorder as well as the buttons on the Commander. The Commander is useful when operating the camcorder from a distance. Be sure to select COMMANDER ON in the menu before operation. (See page 59.)

(M-1)

1 **Hold down the green button and slide the POWER switch to VTR.**

2 **Insert a cassette.**

3 **Turn on the TV and the VCR.**
- For a TV with video/audio input jacks: Set the TV/VTR selector to VTR.
- For a TV without video/audio input jacks: Select the channel for playing back the camcorder.

4 **Press ▷.**
Playback starts.
The ▷ on the camcorder can also be used.

To view a still picture
Press ❚❚ during playback.

To resume playback
Press ▷ or ❚❚ again.

To stop playback
Press ■.

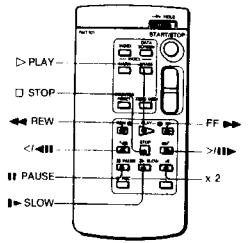
To rewind the tape
Press ◀◀.

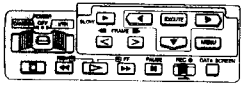
To advance the tape rapidly
Press ▶▶.

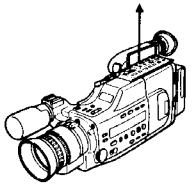
After playback
Set the POWER switch on the camcorder and the CHARGE/VTR selector on the AC power adaptor to OFF.

Note
When the still picture lasts for 5 minutes or more, the camcorder automatically enters the stop mode.

(M-2)







Various Playback Modes

(M-2)

To view a still picture (playback pause)
Press II during playback.
II◀ or ▶II appears in the viewfinder.
To resume normal playback, press ▷ or II.

To change the playback direction
Press </◀II for the reverse or II▶/> for the forward direction during playback.
– x 1 or x 1 appears in the viewfinder.
To resume normal playback, press ▷.

To view the picture at 1/5 speed (slow playback)
Set the playback direction with </◀II or II▶/>, and then press I▶ during playback.
◀I or I▶ appears in the viewfinder.
When slow playback lasts for 1 minute or more, forward or reverse playback at normal speed starts automatically, according to the tape direction.
To resume normal playback, press ▷.

To view the picture at double speed (Commander only)
Set the playback direction with </◀II or II▶/>, and then press x 2 on the Commander.
– x 2 or x 2 appears in the viewfinder.
To resume normal playback, press ▷.

To view the picture frame-by-frame
Press </◀II or II▶/> in the still picture mode. Each press of the button moves the picture one frame. ◀II or II▶ appears in the viewfinder. If you keep pressing </◀II or II▶/>, playback at 1/30 speed starts.
To resume normal playback, press ▷.

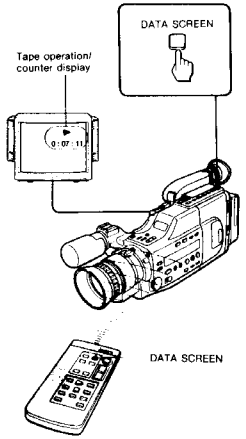
To locate the desired scene — Picture search
Keep pressing ◀◀ or ▶▶ during playback in the still picture mode. ⏪ or ⏩ appears in the viewfinder.
To resume normal playback, release the button.

To locate the desired scene quickly — Skip scan
Press ◀◀ while rewinding or ▶▶ while advancing the tape rapidly. ⏪ or ⏩ appears in the viewfinder.
To resume normal playback, press ▷.

Notes during the above playback
- Sound is heard only in the double speed forward playback only. The sound has noise.
- Noise may appear in the still picture.
- Streaks may appear when pressing the ◀◀ or ▶▶.
- Streaks may appear when playing back a tape recorded in the LP mode in the still, frame-by-frame, or slow.
- The color of the picture may change during still, frame-by-frame, slow or when using the ◀◀ or ▶▶ button.

If picture is noisy during frame-by-frame or slow playback
Adjust the picture referring to "PICTURE ADJUST menu" (page 60) while playing back the tape in slow speed.
The noise may not be eliminated if the tape was recorded on another VCR.

(M-3)



Displaying the Information in the Viewfinder onto the TV Screen

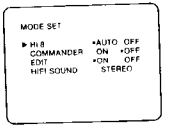
(M-3)

Connect the camcorder and the TV properly and press the DATA SCREEN button.
The indication in the viewfinder is superimposed on the TV screen. This function is convenient to monitor the indications in the viewfinder during menu operations or when the camcorder is remotely operated by the Commander.

To clear the indication
Press the DATA SCREEN button again.

Note
When using the camcorder as a playback VCR during editing, be sure to clear the indications from the TV screen. Otherwise, the indications will be recorded with the picture.

(M-4)



Selecting the Monitor Sound

(M-4)

The playback sound can be selected by the menu.
Refer to "Using the Menu during Playback or Editing" (page 59) for details.

When playing back an AFM Hi-Fi stereo sound recorded tape
Select STEREO.

When playing back a dual sound recorded tape
Select 1 or 2 to monitor the desired sound.

Using the Tape Counter

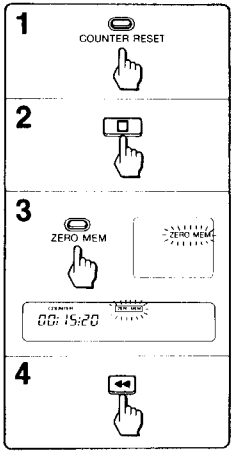
The counter in the viewfinder and the display window indicates the elapsed time of the recording or playback.

To Index the Entire Tape

Press the COUNTER RESET button at the beginning of the tape so that the counter shows "0:00:00".
Write down the counter reading at a particular point so that you can easily find that point later by referring to the tape counter.

To Return to a Pre-registered Point

(N)



1 During playback, press the COUNTER RESET button at the point to be located later.

2 Press ■ when the playback is finished.

3 Press the ZERO MEM button.
The "ZERO MEM" indication blinks in the viewfinder and the display window.

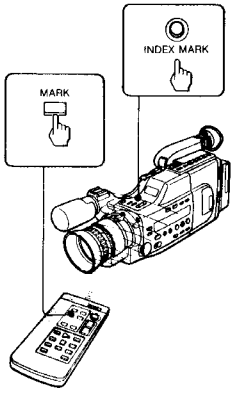
4 Press ◀◀ or ▶▶.
The tape rewinds or advances and stops automatically when the counter reaches approximately "0:00:00".

To cancel the ZERO MEM function
Press the ZERO MEM button.

Notes on the counter and the ZERO MEM button

- The counter reading and the actual point on the tape may not correspond exactly. Use the counter as a guide. There will be a lag of several seconds especially when fast-forward and rewind operation is repeated or when playing back a tape with both the SP mode and LP mode recording.
- Be sure to press the ZERO MEM button after the tape stops. It does not function during recording or playback.
- The ZERO MEM mode is automatically canceled after each operation.

(O-1)



Marking Index Signals during Playback

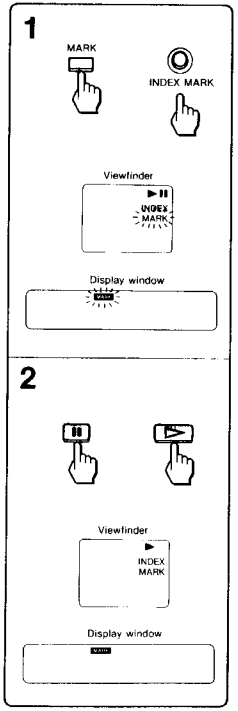
The beginning of the desired program can be located easily be marking an index signal and searching for it later.

To Mark an Index Signal during Playback

(O-1)

Press the INDEX MARK button on the camcorder or the Commander at the point you wish to locate later.
The INDEX MARK indication appears in the viewfinder and MARK appears in the display window to indicate that the index signal has been marked.

(O-2)



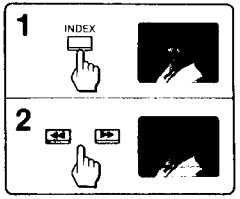
To Mark an Index Signal at the Beginning of the Playback

(O-2)

1 **Press the INDEX MARK button on the camcorder or the Commander in the playback pause mode.**
The INDEX MARK indication appears in the viewfinder with MARK blinking and MARK blinks in the dispaly window.

2 **Press ❚❚ or ▷ to release the playback pause mode.**
The MARK indication stops blinking to indicate that the index signal has been marked.

(O-3)



Scanning or Searching the Beginning of a Program during Playback

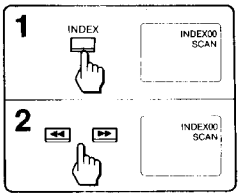
To scan the beginning of each program while monitoring the picture — Index scan (1)
(O-3)

1 **Press the INDEX button on the Commander during playback or playback pause mode.**

2 **Press ◀◀ or ▶▶.**
The tape is played back for approximately 10 seconds from the point where the index signal was marked.

3 **Press ▷ when the desired program is displayed to continue playback.**
When no button is pressed, the picture is automatically scanned to the next or previous program.

(O-4)



To scan the beginning of each program in sequence — Index scan (2)
(O-4)

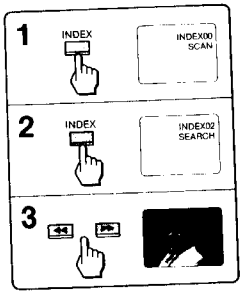
1 **Press the INDEX button on the Commander during stop mode.**

2 **Press the ◀◀ or ▶▶ button.**
The tape is played back for approximately 10 seconds from the point where the index signal is marked.

3 **Press ▷ when the desired program is displayed to continue playback.**
When no button is pressed, the picture is automatically scanned to the next or previous program.

To cancel the Index scan mode
Press ▷.

(O-5)



To locate the desired program — Index search

(O-5)

1 **Press the INDEX button on the Commander once during stop or playback mode.**

2 **Press the INDEX button on the Commander until the index number of the desired program is displayed in the viewfinder.**

3 **Press ◀◀ or ▶▶.**
The playback starts from the beginning of the desired program.

To correct the Index number
Press ■ and repeat the steps above.

Marking Index Signals during Playback

Erasing the Index Signals

(O-6)

(O-6)

1 Locate the index signal to be erased by index scan or index search.

2 Press the INDEX ERASE button on the Commander within approximately 10 seconds while the tape is being played back.

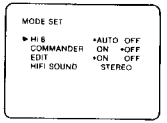
3 After the index signal is erased, the camcorder returns to index scan or index search, whichever was used in step 1.

Notes when erasing index signals

- Press the ERASE button more than 2 seconds after the playback begins in step 2.
- The index signals cannot be erased if the red tab on the cassette is slid out.
- The recorded sound cannot be heard and a black band appears in the bottom of the picture while the index signal is being erased. This will not affect the recorded sound or picture.
- Index signals marked with VCRs such as the EV-S900 series can be detected but cannot be erased with this camcorder.
  Index signals marked with this unit can be detected but cannot be erased with VCRs such as the EV-S900 series.
- Index signal may be erased when PCM after recording is made in the portion where the index signal is marked.

Using the Menu during Playback or Editing

(P-1)



MODE SET menu and PICTURE ADJUST menu can be used during playback or editing. In the MODE SET menu, various settings to further enjoy the features of the camcorder can be selected. In the PICTURE ADJUST menu, the picture in the still or slow mode can be adjusted.

MODE SET Menu

(P-1)

Hi8 AUTO/OFF

- Select AUTO to set the recording mode (Hi8 or normal) automatically depending upon the tape being used.
- Select OFF if you wish to record in the normal mode regardless of the type of tape being used.

EDIT ON/OFF

- Select ON when performing editing with the camcorder as the playback VCR to keep the degradation of picture resulting from editing to the minimum.
- Select OFF otherwise.

COMMANDER ON/OFF

- Select ON when using the supplied Remote Commander for playback or editing.
- Select OFF when the supplied Remote Commander will not be used for playback or recording.

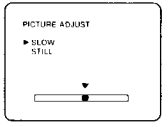
HIFI SOUND STEREO/1/2

- Normally select STEREO. The tape recorded in AFM Hi-Fi stereo will be played back in stereo.
- Select [1] or [2] to play back the desired sound of the dual sound recorded tape.

Note

Always return the setting to STEREO. Otherwise, the tape recorded in stereo will not be played back properly.

(P-2)



PICTURE ADJUST Menu

(P-2)

SLOW

Press ◄ or ► to clear out the noise bands that may appear on the top or bottom of the picture during slow playback. Adjustable only in the slow playback mode.

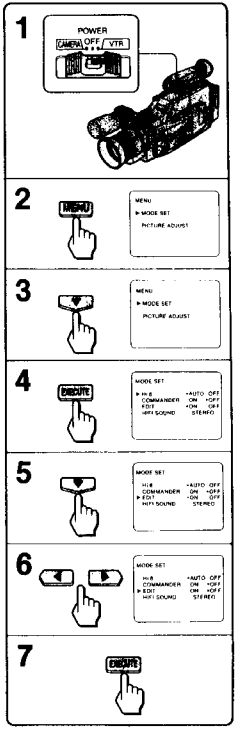
STILL

Press ◄ or ► so that the vertical shaking of the picture during still mode will stop. Adjustable only in the still mode.

Note

When playing back a still picture of a tape recorded in the LP mode, this camcorder automatically adjusts the picture to reduce vertical shaking to the minimum. Therefore, the STILL adjustment of the PICTURE ADJUST menu is not operable.

(P-3)



Using the Menu during Playback or Editing

How to Call Up the Menu Display

Press the DATA SCREEN button to display the menu on the TV screen.

(P-3)

Example: To select EDIT OFF.

1 Set the POWER switch to VTR and insert a cassette.

2 Press the MENU button.
The MENU display appears.

3 Press ▼ and move cursor to the desired item.

4 Press the EXECUTE button.
The selected menu appears.

5 Press ▼ and move cursor to the desired item.

6 Press ◄ or ► to select the desired setting.

7 Press the EXECUTE button.
The setting is stored in the camcorder and the menu display is cleared.

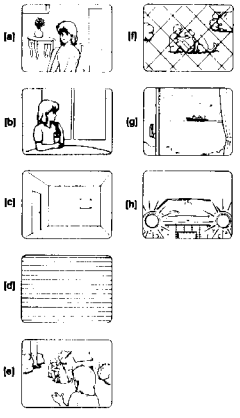
The setting is stored in the memory even if the POWER switch is returned to OFF or the battery pack is removed, as long as the lithium battery is installed.

To display another menu
Start from step 1 in "How to Call Up the Menu Display."

To return to the original screen
Press the MENU button.

To make multiple settings within one menu
After step 6 in "How to Call Up the Menu Display", press ▼ and move cursor to the desired item.

(Q-1)



Manual Focusing

When the AUTO LOCK switch is set to AUTO LOCK, the auto-focusing functions to easily get a in-focused picture under most shooting conditions. But manual focusing is recommended under the following cases.

[a] to [i] corresponds to the illustrations. **(Q-1)**

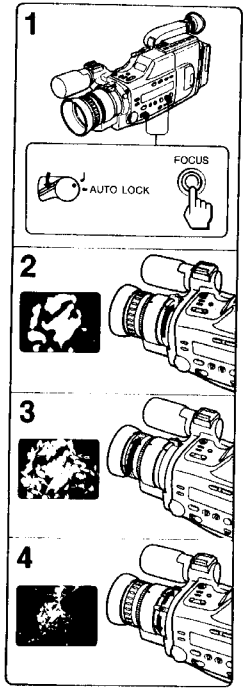
[a] Insufficient light
[b] Strong illumination from behind the object
[c] Objects with little contrast such as a wall, sky, etc.
[d] Finely detailed repetitive patterns, horizontal stripes, diagonal subject
[e] One object is close and the other is at a distance but is in the center
[f] Objects beyond nets, or another object passes just in front of the camcorder
[g] Object beyond frosted glass
[h] Bright object or object reflecting light
[i] Under special shooting conditions:
- When using conversion lenses or effect filters
- When shooting close-ups
- When shooting a stationary objects using a tripod
- To prevent battery wear

Note on automatic focusing
While recording with the auto focusing function, do not touch the focus ring forcibly.

When the auto focusing does not function momentarily
- Shutter speed setting is changed.
- Programmed AE mode is changed.
- Aperture value is changed.
- Gain setting is changed.
- Lighting condition change quickly.
- Zooming from wide to telephoto.
- The camcorder is rapidly panned from a distant subject to a nearby subject with less contrast.
- Shooting fast moving objects.

Some helpful hints
- When shooting relatively dark places, such as indoors, the depth of field in proper focus is very shallow.
- When shooting with auto focusing with the zoom lever set to the wide angle position, the focus ring will be fixed around the 2 m position and may not exactly match the actual object-to-camera distance.
- The figures on the focus ring indicate the distance between the object and the Φ mark on the camcorder.

(Q·2)



Focusing Manually

(Q·2)

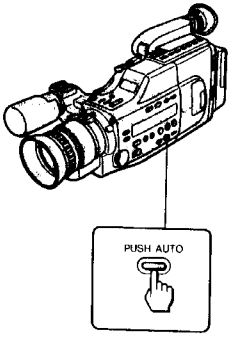
1 Set the AUTO LOCK switch down and press the FOCUS button.
Check that the auto focus frame is cleared from the viewfinder.

2 Turn the manual zoom lever fully to the telephoto position.

3 Turn the focus ring to achieve sharp focus.

4 Move the zoom lever to set to the desired shot length.

(Q·3)



Shooting with Auto Focusing Momentarily

(Q·3)

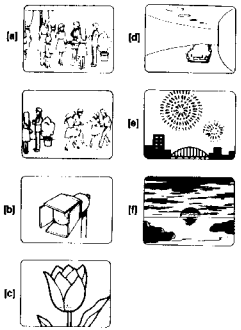
While shooting with manual focusing, press the PUSH AUTO button.
The auto focus functions while you are pressing the PUSH AUTO button.

When the button is released, manual focusing will resume. Use this button when focusing on one object to the other for natural focusing. Shutter speed, white balance, gain, aperture, and/or programmed AE modes will be retained to the previous setting.

When the camcorder focuses on the background during auto focusing
To focus on the subject on the foreground, first shoot the subject on the foreground or set the focus ring to 1.1 m manually. Then set the AUTO LOCK switch to AUTO LOCK or press the PUSH AUTO button.

When the camcorder focuses on the foreground during auto focusing
To focus on the background, first shoot the distant view or set the focus ring to ∞ manually. Then set the AUTO LOCK switch to AUTO LOCK or press the PUSH AUTO button.

(R-1)

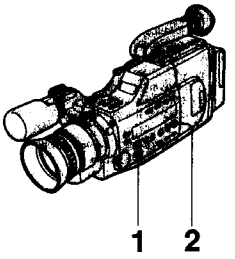


Adjusting the White Balance

In order to record the color of the object as it is, the common method is to adjust the camcorder to record the white color as white in various shooting conditions. This is accomplished by adjusting the white balance. When the AUTO LOCK switch is set to AUTO LOCK, the auto white balance functions adjust the white balance under most shooting conditions. But to record the color of the subject more precisely, without being affected by the color temperature of the ambient light, adjust the white balance manually.

[a] to [f] corresponds to the illustrations. **(R-1)**

	Conditions	Indication in the viewfinder
[a]	Lighting conditions change quickly	
[b]	Too bright, such as in photograph studios	
[c]	Monochromatic subject or background	
[d]	Under a sodium lamp	
	Under a mercury lamp	
	Under a color matching fluorescent lamp	
[e]	Recording outdoors: a night view, neon signs, or fireworks	
[f]	Recording outdoors: scenes after sunset or before sunrise	



Adjusting the White Balance Manually

(R-2)

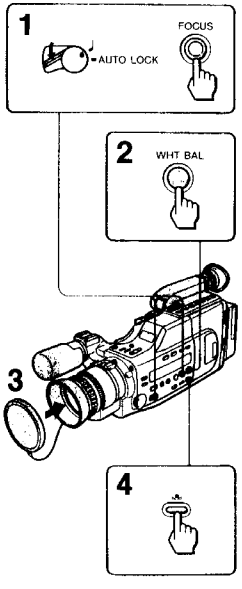
1 Set the AUTO LOCK switch down.

2 Set to the appropriate white balance mode by pressing the WHT BAL button.
The indication changes in the order below each time the button is pressed.

No indication → → → → (auto)

Note on manual white balance adjustment
Each time the shooting conditions changes, for example when moving from indoors to outdoors or vice versa, the white balance should be reset to the new lighting condition. First, set the AUTO LOCK switch to AUTO LOCK. Then set it down again for manual white balance adjustment.

(R-3)



Adjusting the White Balance Precisely

(R-3)

The one-push white balance function adjusts the white balance at the press of the button and maintains that condition. When the lighting condition changed or when recording subjects with different color temperature, use the one push white balance function to achieve recording with natural colors without being affected by the ambient light.

1 Set the AUTO LOCK switch down and press the FOCUS button.
The camcorder enters the manual focus mode.

2 Press the WHT BAL button to call up the indication.
The indication is blinking slowly.

3 Attach the white lens cap to the camcorder and point the it to a subject (outdoors) or to the light source (indoors).

4 Press the button in the recording standby mode.
The indication will blink rapidly.

5 The indication stops blinking to indicate that the new white balance is stored in the memory.
The memory is retained for approximately 1 hour even if the POWER switch is set to OFF or if the battery pack is removed.

When recording under fluorescent light
- Press the WHT BAL button to clear the white balance indication and return to automatic white balance adjustment.
- Use the one push white balance function.
- Set the AUTO LOCK switch to AUTO LOCK.

(R-4)

Color temperature (K)		Light source
↑ Blue	10,000	Clear sky
	8,000	
	7,000	Slightly overcast
	6,000	Cloudy, rainy, Flourescent lamp (daylight)
	5,000	
White		Direct sunlight, Fluorescent lamp (daylight)
	4,000	1 hr. after/before sunrise/sunset, Fluorescent lamp (off white)
	3,500	Studio lamp, Halogen lamp
	3,200	
	3,000	
Yellow		Tungsten lamp
	2,500	30 min. after/before sunrise/sunset
Red		
↓	2,000	Sunrise/sunset, Candlelight

White Balance and Color Temperature

(R-4)

The color temperature indicates the relative reddishness or bluishness of light measured in Kelvin degrees (K). It increases as the light source gets bluish and decreases as the light source gets redder. If has no direct relation with brightness of the light. The camcorder automatically adjusts the white balance within the range shown in the diagram on the left.

What the indication mean
- Slow blinking: white balance not adjusted
- Fast blinking: white balance being adjusted by the button.
- Stops blinking: white balance adjusted

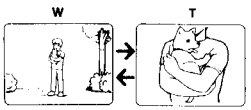
When the indication does not stop blinking
The white balance cannot be adjusted and the indication does not stop blinking.
- When the camcorder was pointed to an object that was not white.
- When white balance adjustment was attempted without the white lens cap.

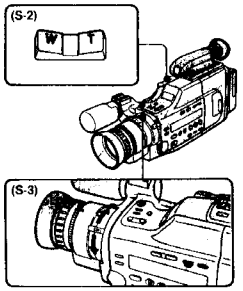
In these cases, point the camcorder to a bright light source or point the camcorder to a white object.

If the indication still does not stop blinking
- Press the WHT BAL button to clear the white balance indication and return to automatic white balance adjustment.
- Set the AUTO LOCK switch to AUTO LOCK.

When the lighting condition changed
- Readjust the white balance by the button during the recording standby mode. The button does not function during recording.
- The white balance adjustment is effected by the setting of the aperture and shutter speed. When the aperture or shutter speed is adjusted manually, and the camcorder was move from indoors to outdoors or vice versa, the white balance setting may not be correct. In this case, set the AUTO LOCK switch to AUTO LOCK again and readjust the white balance automatically.

(S-1)





Zooming

(S-1)

The size of the subject in the screen can be changed. Use "zoom-in" for dramatic close-ups and "zoom-out" for panoramic long shots. Also, use zooming during manual focusing. The camcorder's zoom button offers a variable speed zooming; pressing it firmly for high speed zooming and softly for relatively slow zooming.

Power Zooming — for Smooth and Constant Zooming

(S-2)

Press the T side of the power zoom button for telephoto.
This gives a close up shot of an object far from the lens.

Press the W side of the power zoom button for wide.
This gives a broad view of the scene.

Manual Zooming — to Create a Dramatic Effect

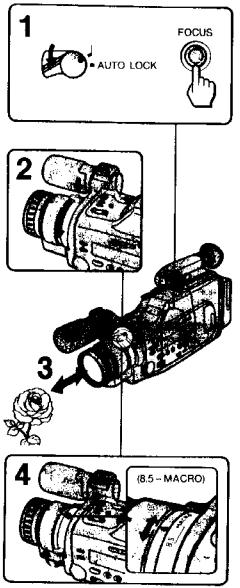
(S-3)

Turn the manual zoom lever upward for telephoto and downward for wide.

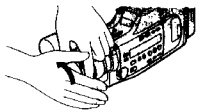
Focal length of this camcorder
The focal length is 8.5 mm to 68 mm (11/32 to 2 3/4 inches). This is approximately 46 mm to 367 mm (1 7/8 to 14 1/2 inches converted to the focal length of a 35 mm camera.

Using the zoom button on the Commander
Variable speed zoom cannot be operated with the zoom button on the Commander.

(T-1)



(T-2)



Close-ups (Macro)

Tiny objects such as flowers, insects, and images in photographs, can literally fill the screen using the close-up function. It is also useful when recording a title.

(T-1)

1 **Set the AUTO LOCK switch down and press the FOCUS button.**
Check that the auto focus frame is cleared from the viewfinder.

2 **Turn the zoom lever, while pressing the green macro button, to the left as far as it will go into the MACRO range.**

3 **Bring the camcorder as close as necessary to the subject to obtain the desired subject size.**
The subject can be as close to the lens surface at approximately 10 mm (13/32 inch).

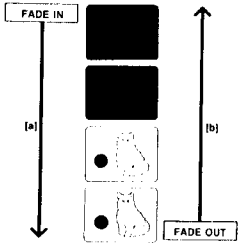
4 **Turn the zoom lever within the MACRO range to focus sharply.**

Notes
- Auto focusing does not function in macro shooting.
- If the object is closer than 10 mm (13/32 inch), it cannot not be brought in focus.

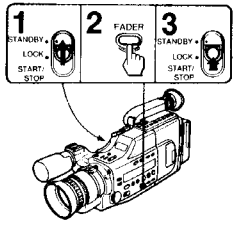
If the lens hood touches the object (T-2)
Remove the lens hood. Hold the focus ring and turn the hood by pressing it with your palm. Do the same when attaching or removing the filter or conversion lens (not supplied).

Recommended accessory
When shooting in macro, the depth of field is very shallow. Pay attention to focusing. To keep the object in focus, use a tripod.

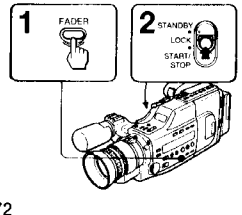
(U-1) (U-2)



(U-3)



(U-4)



When fading-in, the picture will gradually appear from a black screen. The sound will gradually increase in accordance with the picture. **(U-1)**
When fading-out, the picture will gradually disappear into a black screen. The sound will gradually decrease in accordance with the picture. **(U-2)**
Use this function to give a professional effect to your recording.

To Fade-in

(U-3)

1 **Slide the STANDBY switch up.**
The camcorder enters the recording standby mode.

2 **Press the FADER button.**

3 **Press the START/STOP button.**
Fade-in is performed and recording starts.

To Fade-out

(U-4)

1 **Press the FADER button while recording.**

2 **Press the START/STOP button to stop recording.**
Fade-out is performed and then recording stops.

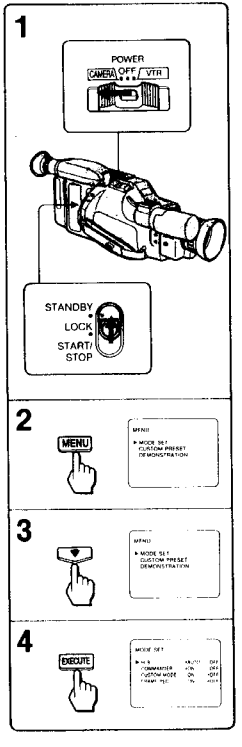
When does the FADER function work
The FADER function works only when the camcorder is in the recording standby mode or recording mode.
It does not function in the stop mode.

To cancel the fade-in/fade-out function before it is preformed
Press FADER before pressing START/STOP.

To use the fade-in/fade-out function repeatedly
Start from step 1 each time.

When the title, date or time is displayed
The title, date or time does not fade-in or fade-out.

(V)



(V)

A recording of approximately 4 frames can be performed with this camcorder. With this function, an animated effect can be recorded by performing frame recording after moving the subject little by little. Fix the camera at one point and use the Commander for effective frame recording.

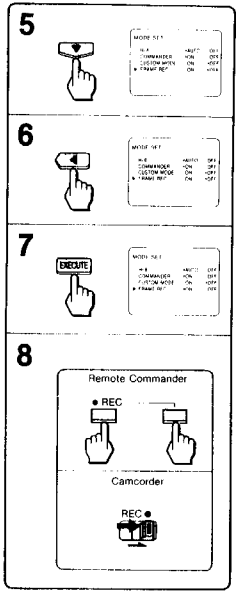
1 **Set the POWER switch to CAMERA and slide the STANDBY switch up.**

2 **Press the MENU button.**

3 **Press ▼ and move cursor to MODE SET.**

4 **Press the EXECUTE button.**
MODE SET menu appears.

Continued on the next page



[redacted]

5 Press ▼ and move cursor to FRAME REC.

6 **Press ◀ or ▶ and select ON.**
When performing frame recording using the Remote Commander, select COMMANDER ON.

7 **Press the EXECUTE button.**
The setting is stored in the memory and the menu display in the viewfinder disappears.

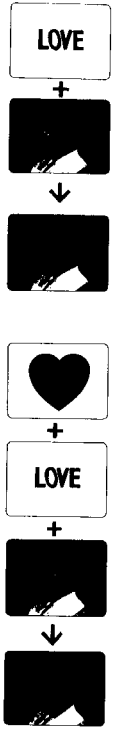
8 **Start camera recording with the camcorder or the Remote Commander.**
Recording of approximately 4 frames is performed. After frame recording is completed, the camcorder will enter the recording standby mode with STBY indication in the viewfinder.

9 **Move the subject and repeat step 8.**

To record input signals from the VIDEO, AUDIO, S VIDEO jacks

1 Connect the camcorder and the external video source referring to page 116.
2 Set the POWER switch to VIDEO.
3 Set the camcorder to the recording pause mode with a REC and PAUSE.
4 Repeat step 8 above.

(W-1)



[redacted]

(W-1)

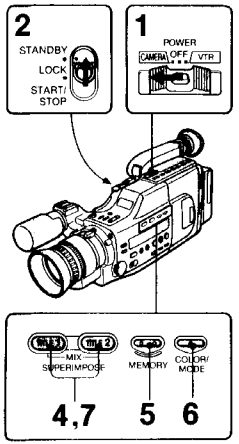
Original hand-lettered message or illustration can be superimposed over the picture. Two titles can be stored and 8 different colors can be used for the titles.

This function can be used during the following situations.

(1) During camera recording.
(2) During playback.
(3) During camera recording, superimpose a title.
Then superimpose different titles during playback.
(4) During editing, use the camcorder as a playback VCR. Titles can be superimposed over the playback picture (with or without a title superimposed) and then recorded together onto the recording VCR.

Before recording, store the desired title in the camcorder.

(W·2)



Storing a Title

(W·2)

Before storing

- Prepare title cards.
  Use a plain, white card and draw titles with in dark color and thick lines. Street signs and printed materials with high contrast can be used as a title.
- Install the lithium battery (page 27).
  The titles cannot be kept in the memory unless the lithium battery is installed.

Operation

1 **Hold down the green button and slide the POWER switch to CAMERA.**

2 **Slide the STANDBY switch up.**
The camcorder enters the recording standby mode.

3 **Point the camcorder to the title card and adjust the focus.**
To focus on the title, use the macro function. (page 71).

4 **Press the TITLE 1 or TITLE 2 button.**

5 **Press the MEMORY button.**
The title is stored to the button pressed in step 4.

6 **Press the COLOR/MODE button to select the color of the title.**
Each time you press the button, the indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

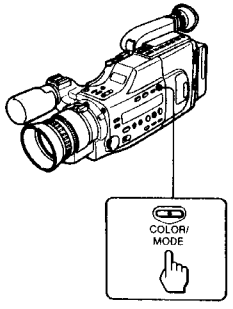
7 **Press the TITLE 1 or TITLE 2 button, whichever was pressed in step 4, to clear the title from the viewfinder.**
The title is stored to that button until you store another one over it.

To check the title
Press the TITLE 1 or TITLE 2 button, whichever was pressed in step 4, in the standby mode. To clear the title from the viewfinder, press the same button again.

To store a new title to the TITLE 1 or TITLE 2 button
Repeat steps 1 to 7. A new title is stored and the previous title will be deleted from that button.

When storing a title in the memory
When a cassette is installed, the camcorder will return to the power off mode after 5 minutes. Take out the cassette if more than 5 minutes will be needed to store the title.

(W-3)



Function of the COLOR/MODE Button

(W-3)

The COLOR/MODE button works in two ways. When a title is displayed in the viewfinder, the color of the title can be changed. When the title is not displayed, the title display mode can be changed.

To select the color

1 Press the TITLE 1 or TITLE 2 button to display the title.

2 Press COLOR/MODE.
Each time the button is pressed, the color indication changes as follows.

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED

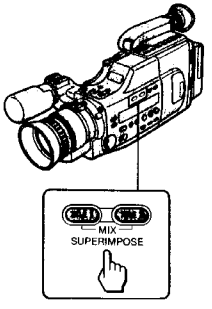
To select the display mode

1 If the title is displayed, press TITLE 1 or TITLE 2 button to clear the title.

2 Press COLOR/MODE.
Each time the button is pressed, the mode indication changes as follows.

↑: Scroll up the title.
↓: Scroll down the title.
■: Reverse the title.
T↑: Reverse the title and scroll it up.
T↓: Reverse the title and scroll it down.

(W-4)



Superimposing One Title

(W-4)

1 During playback or recording, press the TITLE 1 or TITLE 2 button at the point from which you want to use the title.
The title is displayed. During recording the title will be recorded on to the tape. During playback the title will not be recorded on the tape.

2 Press the same button pressed in step 1 at the point you wish to clear the title.

When recording the title at the beginning
We recommend the following method.

1 Set the camcorder in the standby mode.

2 Display the title referring to step 1 above.

3 Release the standby mode.

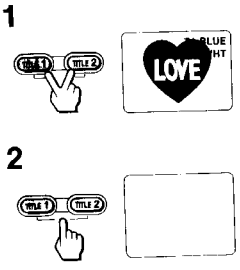
4 Clear the title referring to step 2 above.

When recording a title onto the playback picture
The title can be superimposed on the playback picture but cannot be recorded with this camcorder alone. Make connections for editing and record the picture with title superimposed on another VCR. (See page 114).

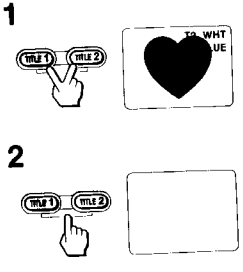
About the color indication
- The color indication in the viewfinder is not recorded.
- Even after the title is displayed, the color can be changed by pressing the COLOR/MODE button.

When displaying the title in the playback mode
The title is cleared if you press ◀◀ or ▶▶.

(W-5)



(W-6)



Layering One Title over the Other

The title stored in the TITLE 1 button and the TITLE 2 button can be displayed at the same time with one title layered on the other.

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

To display TITLE 1 in the background and TITLE 2 in the foreground
(W-5)

1 **During playback or recording, hold down the TITLE 1 button and press the TITLE 2 button.**

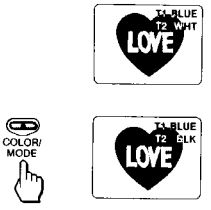
2 **Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.**

To display TITLE 2 in the background and TITLE 1 in the foreground
(W-6)

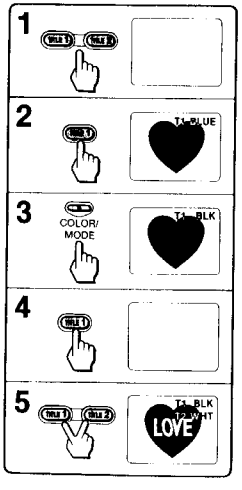
1 **During playback or recording, hold down the TITLE 2 button and press the TITLE 1 button.**
In this case, TITLE 2 "LOVE" is hidden behind TITLE 1 and is not showing. Before using this function, check whether the title stored in the memory is appropriate for this application.

2 **Press the TITLE 1 or TITLE 2 button at the point you wish to clear the title.**

(W-7)



(W-8)



To Change the Color of the Title after Layering One Title over the Other

Example: When a blue heart is stored in the TITLE 1 button and a white title "LOVE" is stored in the TITLE 2 button.

To change the color of the title in the foreground
(W-7)

Press the COLOR/MODE button.
Each press of COLOR/MODE will change the color of "LOVE".

To change the color of the title in the background
(W-8)

1 **Press the TITLE 1 or TITLE 2 button to clear the title.**

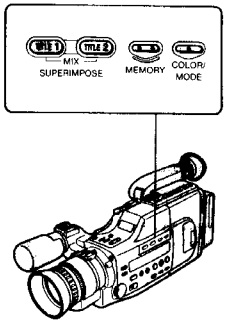
2 **Press the TITLE 1 button.**
TITLE 1, blue heart, is displayed.

3 **Press the COLOR/MODE button to change the color of TITLE 1.**
The color of TITLE 1, blue heart, changes.

4 **Press the TITLE 1 button.**
TITLE 1, black heart, is cleared from the picture frame.

5 **Hold down the TITLE 1 button and press the TITLE 2 button.**

(W-9)



Various Title Display Modes

Follow the steps below to enjoy the various title display modes.

(W-9)

Step 1
During camera recording or playback, press the COLOR/MODE button to select the title display modes. Refer to the following page for the available modes.

Step 2
Call up the title.

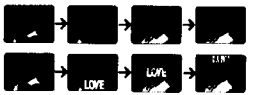
To display one title:
Press the TITLE 1 or TITLE 2 button.
To layer one title over the other:
Call up the title referring to page 80.

Step 3
Clear the title.

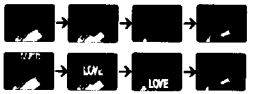
When one title is displayed:
Press the same button pressed in step 2.
When one title is layered over the other:
Press the TITLE 1 or TITLE 2 button.

(W-10)

(W-11)



(W-12)



(W-13)

(W-14)

(W-15)

Title display modes
Each press of the COLOR/MODE button in step 1 changes the title display modes in the following order.

- **Normal title display (W-10)**

- **Scrolling up the title (W-11)**
Step 1: The ↑ indication is displayed.
Step 2: The title is scrolled upwards to the center and stops.
Step 3: The title is scrolled up and out of the picture frame.

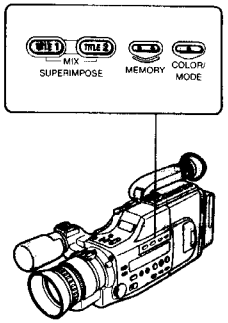
- **Scrolling down the title (W-12)**
Step 1: The ↓ indication is displayed.
Step 2: The title is scrolled downwards to the center and stops.
Step 3: The title is scrolled down and out of the picture frame.

- **Reversing the title with the picture (W-13)**
Step 1: The ■ indication is displayed.
Step 2: The reversed title is displayed.
Step 3: The title is cleared from the picture frame.

- **Scrolling up the reversed title (W-14)**
Step 1: The ■↑ indication is displayed.
Step 2: The reversed title is scrolled upwards to the center.
Step 3: The reversed title is scrolled up and out of the picture frame.

- **Scrolling down the reversed title (W-15)**
Step 1: The ■↓ indication is displayed
Step 2: The reversed title is scrolled downwards to the center.
Step 3: The reversed title is scrolled down and out of the picture frame.

(W-9)



Various Title Display Modes

Follow the steps below to enjoy the various title display modes.

(W-9)

Step 1
During camera recording or playback, press the COLOR/MODE button to select the title display modes. Refer to the following page for the available modes.

Step 2
Call up the title.

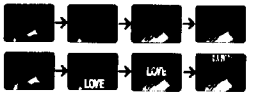
To display one title:
Press the TITLE 1 or TITLE 2 button.
To layer one title over the other:
Call up the title referring to page 80.

Step 3
Clear the title.

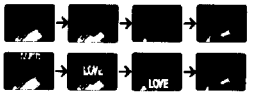
When one title is displayed:
Press the same button pressed in step 2.
When one title is layered over the other:
Press the TITLE 1 or TITLE 2 button.

(W-10)

(W-11)



(W-12)



(W-13)

(W-14)

(W-15)

Title display modes
Each press of the COLOR/MODE button in step 1 changes the title display modes in the following order.

- **Normal title display (W-10)**

- **Scrolling up the title (W-11)**
Step 1: The ↑ indication is displayed.
Step 2: The title is scrolled upwards to the center and stops.
Step 3: The title is scrolled up and out of the picture frame.

- **Scrolling down the title (W-12)**
Step 1: The ↓ indication is displayed.
Step 2: The title is scrolled downwards to the center and stops.
Step 3: The title is scrolled down and out of the picture frame.

- **Reversing the title with the picture (W-13)**
Step 1: The ■ indication is displayed.
Step 2: The reversed title is displayed.
Step 3: The title is cleared from the picture frame.

- **Scrolling up the reversed title (W-14)**
Step 1: The ■↑ indication is displayed.
Step 2: The reversed title is scrolled upwards to the center.
Step 3: The reversed title is scrolled up and out of the picture frame.

- **Scrolling down the reversed title (W-15)**
Step 1: The ■↓ indication is displayed
Step 2: The reversed title is scrolled downwards to the center.
Step 3: The reversed title is scrolled down and out of the picture frame.

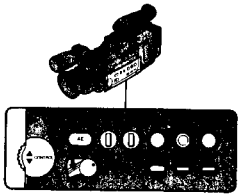
When displaying one title over the other

- TITLE 1 and TITLE 2 cannot be called up in the different title display mode at the same time. For example, calling up TITLE 1 in the reverse mode and TITLE 2 in the scroll up mode at the same is not possible.
- When scrolling the two titles layered, press the second title button before the first title starts to scroll.

Note on scrolling

You can scroll the title only when the camcorder is in the recording standby, recording, or normal playback mode. Only normal title display mode (no indication) and reverse title display mode (■) can be performed during modes other than the three above. (Refer to "Various Playback Modes" on page 48.) If you select the scroll mode first, and then set the camcorder to the modes other than the three above, the scroll mode will be canceled automatically.

(X-1)



Viewfinder	Display window
(X-2)	
(X-3)	
(X-4) Example: [AE] A / 500 / ▶ F8	Example
(X-5) Example: [AE] S / ▶ 500 / F8	Example
(X-6) The selected parameters displayed. Example: 250 / ▶ F4 / 0 dB	Example

Recording a Picture Using Programmed AE and Manual Modes

(X-1)

A variety of camera recording modes can be selected for this camcorder, from the full automatic mode to the programmed AE mode in which camera recording modes most suited for the subject and/or the condition is adjusted automatically. In addition, the manual mode enables independent setting of the aperture value, shutter speeds, and gain. Setting of a single parameter or a combination of two or three parameters at one time is possible.

Camera Recording Modes Available

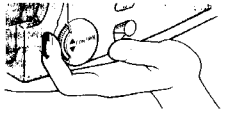
With the AUTO LOCK switch set down, each press of the PROGRAM AE button changes the camera recording mode as follows.

Portrait (X-2)
↓
Sport (X-3)
↓
Aperture priority (X-4)
↓
Shutter priority (X-5)
↓
Manual (X-6)

During programmed AE and manual modes

Focus and white balance can be adjusted independently from the programmed AE mode or the manual mode. Manual adjustment of focus and white balance is recommended.

(X-7)



Shooting a Picture Using Programmed AE Modes

How to use the CONTROL dial (X-7)
Move the dial slowly using the tip of your index finger. If the dial is released immediately after holding it to the maximum position, the sound of the dial returning to the normal position may be recorded.

When recording in the aperture priority mode or the manual mode
Do not point the lens at the sun or other light sources when the aperture value is set to F1.4.

(Y-1)

Portrait Mode

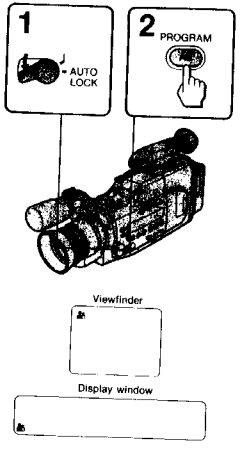
(Y-1)

In the portrait mode, the subject is in focus and the background is out of focus. The aperture (opening of the iris) and the shutter speed is automatically adjusted to maintain the appropriate exposure according to the size and brightness of the subject. The portrait mode is most effective when used outdoors.

Portrait Mode Applications

- To shoot a subject with not much movement, such as a portrait of a person or a close up of a flower.
- To zoom in a subject with the telephoto mode.
- To shoot a subject with an obstruction in the foreground.

(Y-2)



Operation

(Y-2)

1 Set the AUTO LOCK switch down.

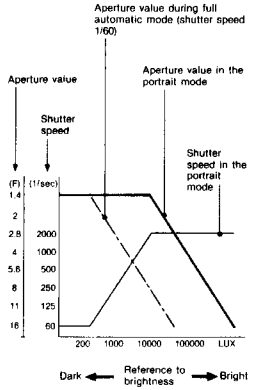
2 Press the PROGRAM AE button until the indication is displayed in the viewfinder and the display window.
The camcorder enters the portrait mode.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the portrait mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the portrait mode
Focus and white balance can be adjusted manually. See page 64 (focus) and page 67 (white balance) for details.

(Y-3)



Hint for effective camera work
Use of the portrait mode with the following method will gradually make the background out of focus while keeping the subject in focus.

1 Enter the portrait mode referring to page 87.

2 Set the AUTO LOCK switch to AUTO LOCK and start recording.

3 Set the AUTO LOCK switch down.
The camcorder will enter the portrait mode and make the background out of focus.

The theory of the portrait mode
(Y-3)

When shooting outdoors under bright sunlight in the full automatic mode, the aperture tends to close and both the subject and the background comes into focus (deep depth of field). This is a result of excessive light. In order to bring the subject in focus and keep the background out of focus (shallow depth of field), the aperture should be opened. In the portrait mode, the aperture is controlled to open by automatically selecting the shutter speed (between 1/60 to 1/2000 that matches the shooting situation) to maintain the appropriate exposure.

When recording under fluorescent, sodium, or mercury lamps
- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

(Z-1)

Sports Mode

(Z-1)

By recording in the sports mode, a subject moving at high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow mode compared to the full automatic mode. The shutter speed and the aperture is automatically adjusted to maintain the appropriate exposure according to the speed of the subject.

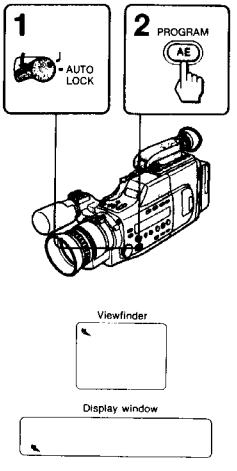
Sports Mode Applications

- To shoot outdoor sports scenes, such as football, tennis, and golf.
- To shoot the scenery from inside a moving automobile.

Operation

(Z-2)

(Z-2)



1 Set the AUTO LOCK switch down.

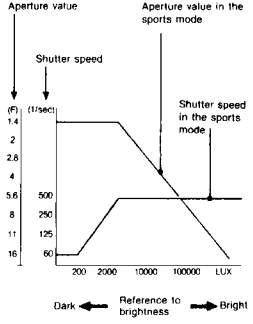
2 Press the PROGRAM AE button until the ✎ indication is displayed in the viewfinder and the display window.
The camcorder enters the sport mode.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the sports mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the sports mode
Focus and white balance can be adjusted manually. See page 64 (focus) and page 67 (white balance) for details.

(Z-3)



Hint for effective camera work
When shooting athletic matches from a distance, such as a football game, we tend to zoom from the wide to the telephoto position to catch the once-only events. Even under these circumstances, by using the sports mode, a sharp picture without camera wobble can be obtained when played back later in the slow or still mode.

The theory of the sports mode (Z-3)
When the shutter speed is shifted to a faster speed, subjects moving at high speed, such as a tennis racket or golf club, can be recorded and then played back clearly with less picture shaking compared to the full automatic mode. With this camcorder, the shutter speed can also be set independently from the aperture. However, the picture may become dark when the lighting condition is insufficient. In the sports mode, the fastest shutter speed that matches the shooting situation (between 1/60 and 1/500) is selected to maintain the appropriate exposure.

Note
- The sports mode is effective under sufficient lighting, such as under sunlight. When used under extremely dark conditions, the shutter speed may not be shifted to high speeds.

When recording under fluorescent, sodium, or mercury lamps
- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

(a-1)

Aperture Priority Mode

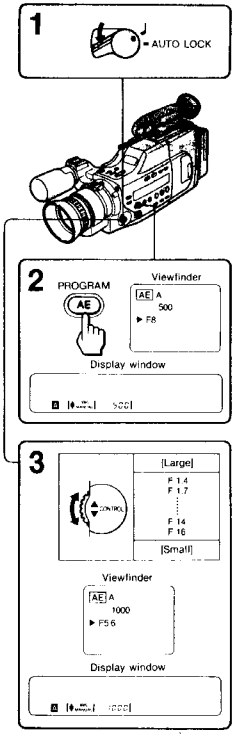
(a-1)

The aperture priority mode enables to select the aperture which determines the depth of field. 15 aperture values, from F 1.4 to F16, can be selected. The shutter speed is automatically set (between 1/60 to 1/2000) in combination with the aperture value to maintain the appropriate exposure.

Aperture Priority Application

To shoot the picture with different depths of field.

(a-2)



Operation

(a-2)

1 Set the AUTO LOCK switch down.

2 Press the PROGRAM AE button until the AE A indication is displayed in the viewfinder and the display window.
The camcorder enters the aperture priority mode.

3 Move the CONTROL dial to set to the desired aperture value.
The selectable aperture values are:
F1.4, F1.7, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16

The shutter speed indication corresponds to the change of the aperture value.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the aperture priority mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the aperture priority mode
Focus and white balance can be adjusted manually.
See page 64 (focus) and page 67 (white balance) for details.

Hints for effective camera work

• Understanding the depth of field
The depth of field is the area in which the objects are in focus. A shallow depth of field shows the subject in focus and the background out of focus. The greatest depth of field shows everything in focus.

• Depth of field and aperture value
A large aperture provides a shallow depth of field and a small aperture provides a deep depth of field.

• Depth of field and object-to-camera distance
When the object-to-camera distance is near, the depth of field will be shallow. When the object-to-camera distance is far, the depth of field will be great.

• Depth of field and zooming
The depth of field will be shallow in the telephoto position. The depth of field will be great in the wide position.

• Summary

	A shallow depth-of-field	A deep depth-of-field
Aperture	Towards open	Towards closed
Object-to-camera distance	Near	Far
Zoom	Telephoto	Wide

When the ► indication in the viewfinder is blinking
The lighting condition is insufficient or excessive for the aperture priority mode. In this case, move the CONTROL dial and reset the aperture.

- **Insufficient light (when the picture inside the viewfinder is dark)**
  Decrease the aperture.
- **Excessive light (when the picture inside the viewfinder is too bright)**
  Increase the aperture.

Although we recommend camera recording without the ► indication blinking, camera recording can be performed even when the ► indication is blinking. Check the picture in the viewfinder before recording.

When recording under fluorescent, sodium, or mercury lamps

- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

(b-1)

Shutter Priority Mode

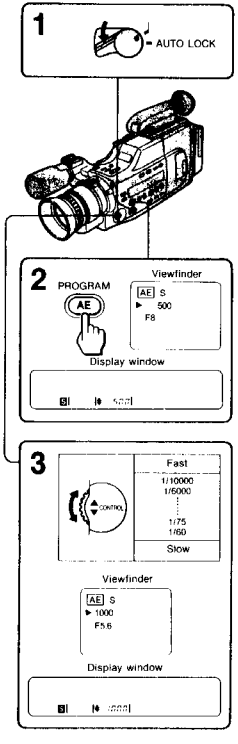
(b-1)

The shutter priority mode enables selection of the shutter speed. 27 shutter speeds can be selected from 1/60 (normal speed) to 1/10000. When a fast shutter speed is selected, subjects moving at high speed can be recorded and the picture can be observed more clearly with less picture shaking in the still or slow modes compared to slower shutter speeds. The aperture value is automatically set (between F1.4 to F16) in combination with the shutter speed to maintain the appropriate exposure.

Shutter Priority Applications

- To shoot a golf swing or a tennis match with the tennis ball captured clearly.
- When you wish playback certain scenes with high speed movements in a clear, sharp picture.

(b-2)



Shutter Priority Mode

Operation

(b-2)

1 Set the AUTO LOCK switch down.

2 Press the PROGRAM AE button until the AE S indication is displayed in the viewfinder and the display window.
The camcorder enters the shutter priority mode.

3 Move the CONTROL dial to set to the desired shutter speed.
The selectable shutter speeds are:
1/60, 1/75, 1/90, 1/100, 1/125, 1/150, 1/180, 1/215, 1/250, 1/300, 1/350, 1/425, 1/500, 1/600, 1/725, 1/850, 1/1000, 1/1250, 1/1500, 1/1750, 1/2000, 1/2500, 1/3000, 1/3500, 1/4000, 1/6000, 1/10000

The aperture value indication corresponds to the change of the shutter speed.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the shutter priority mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the shutter priority mode
Focus and white balance can be adjusted manually. See page 64 (focus) and page 67 (white balance) for details.

Hints for effective camera work
Refer to the chart below for the appropriate shutter speed for the object. Check the brightness of the picture in the viewfinder.

When to use	Recommended speed
• On clear days, recording golf or tennis scenes. (To view the hit ball clearly in the slow or still mode, select shutter speeds between 1/1000 to 1/4000) • Recording the skiers.	1/10000 to 1/600
• On overcast days, recording a moving merry-go-round or a roller coaster. • Recording outdoors stably from inside a moving automobile. • General athletic scenes, marathon, etc.	1/500 to 1/125
• Used in place of the ND2 filter to reduce the exposure to approximately 1/2. • Recording indoors for stable recording.	1/100
• Recording under bright sunlight. To avoid out-of-focus pictures while recording with small aperture.	1/90 to 1/75

When the ▶ indication in the viewfinder is blinking
The lighting condition is insufficient or excessive for the shutter priority mode. In this case, move the CONTROL dial and reset the shutter speed.

Although we recommend camera recording without the ▶ indication blinking, camera recording can be performed even if the ▶ indication is blinking. In this case, check the picture in the viewfinder before recording.

When is shutter speed 1/60 indicated?
1/60 indication is displayed only when the shutter speed is set to 1/60 using the CONTROL dial. Even though the shutter speed is set to 1/60 during the full automatic mode, the indication will not be displayed.

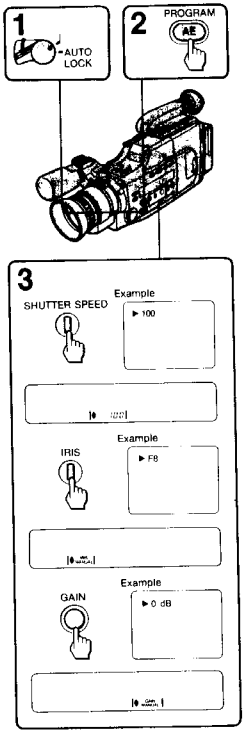
When the shutter speed is set 1/250 or faster
Try to shoot under sunlight outdoors, and with the video light indoors.

When shooting a very bright object
A vertical band (smear) may appear on the screen if shot at high speeds.

When the shutter speed is changed when shooting a TV screen
The brightness of the recorded picture may vary.

When recording under fluorescent, sodium, or mercury lamps
- The brightness of the recorded picture may flicker.
- The color of the recorded picture may vary.

(c-1)



Manual Mode

In the manual mode, independent setting of the aperture value, shutter speeds, and gain can be performed. Setting of a single parameter or a combination of two or three parameters at one time is possible.

Setting One Parameter

(c-1)

1 Set the AUTO LOCK switch down.

2 Press the PROGRAM AE button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

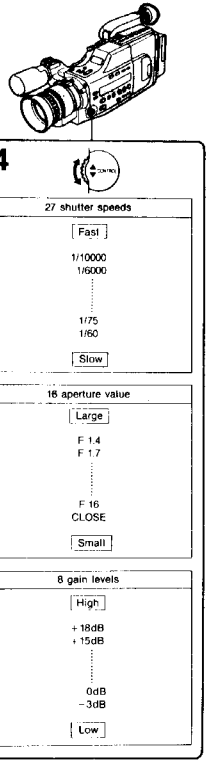
3 Press the button of the parameter to be set.

To set the shutter speed
The first press of the SHUTTER SPEED button sets the shutter speed to 1/100 speed and the second press sets it to 1/1000. To set to other speeds, go to step 4.

To set the aperture value
Press the IRIS button. The aperture is set to the value at the instant the button was pressed.

To set the gain
Press the GAIN button. The gain is set to the level at the instant the button was pressed.

Continued on the next page



4 Select the desired setting by the CONTROL dial.

The indication in the viewfinder changes as shown in the illustration and below.

Selectable shutter speeds
1/60, 1/75, 1/90, 1/100, 1/125, 1/150, 1/180, 1/215, 1/250, 1/300, 1/350, 1/425, 1/500, 1/600, 1/725, 1/850, 1/1000, 1/1250, 1/1500, 1/1750, 1/2000, 1/2500, 1/3000, 1/3500, 1/4000, 1/6000, and 1/10000

Selectable aperture value
F1.4, F1.7, F2, F2.4, F2.8, F3.4, F4, F4.8, F5.6, F6.8, F8, F9.6, F11, F14, F16, and CLOSE

Selectable gain level
−3 dB, 0 dB, +3 dB, +6 dB, +9 dB, +12 dB, +15 dB, and +18 dB

(c·2)

Manual Mode

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

To enter other programmed AE modes from the manual mode
Press the PROGRAM AE button to display the desired programmed AE mode.

When recording in the manual mode
Focus and white balance can be adjusted manually. See page 64 (focus) and page 67 (white balance) for details

The buttons pressed and the indication in the viewfinder
(c·2)

- **When the SHUTTER SPEED button is pressed**

The first press of this button sets the camcorder to the 1/100 shutter speed. The second press sets the camcorder to the 1/1000 shutter speed. For a quick access to the desired shutter speed, first press the button and set to the shutter speed whichever is closer to the desired speed and then turn the CONTROL dial.

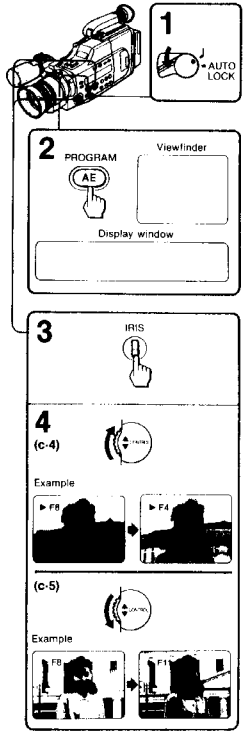
- **When the IRIS button is pressed**

The camcorder indicates the aperture value that was last detected when the camcorder was controlling the aperture automatically. At the same moment, though there is no indication, the gain level will be locked to match the aperture above to maintain the appropriate aperture.

- **When the GAIN button is pressed**

The camcorder indicates the gain level that was last detected when the camcorder was controlling the gain level automatically.
If aperture value was set first, the gain level to match that aperture value to maintain the appropriate exposure will be indicated in the viewfinder.

(c-3)



Aperture Control Applications

(c-3)

Adjust the exposure when there is an extreme difference in the brightness between the subject and the background.

1 Set the AUTO LOCK switch down.

2 Press the PROGRAM AE button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

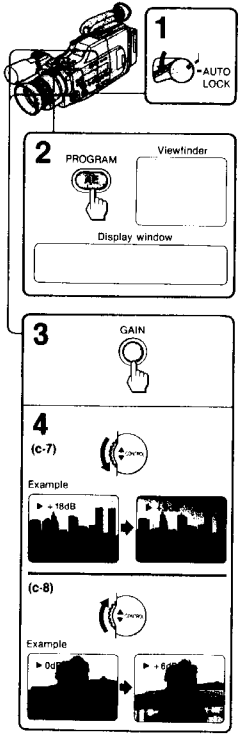
3 Press the IRIS button.

4 Move the CONTROL dial to set the aperture to the appropriate value.

Illumination from behind the subject and opposite the camera (Back light)
(c-4)
Move the CONTROL dial up to decrease the aperture value.

Illumination too strong
(c-5)
Move the CONTROL dial down to increase the aperture value.

(c-6)



Gain Level Control Applications

(c-6)

This camcorder automatically raises the gain level to capture the subject clearly when the shooting condition is dark. Due to this function, the recorded picture may seem brighter than the actual shooting condition. In these cases, set the gain level to reproduce the actual atmosphere. The gain level control can also be applied to adjusting the picture under back light condition without changing the depth of field.

1 Set the AUTO LOCK switch down.

2 Press the PROGRAM AE button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

3 Press the GAIN button.

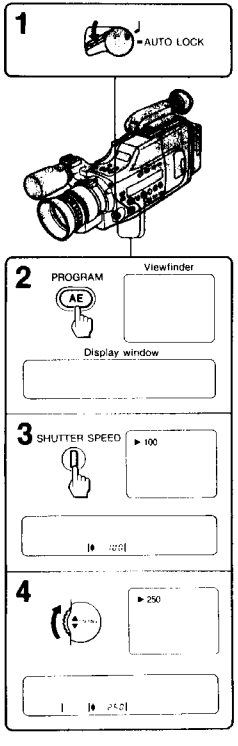
4 Move the CONTROL dial to set the gain to the appropriate level.

Shooting the picture in the dark effectively
(c-7)
Move the CONTROL dial down to lower the gain level.

Illumination from behind the subject and opposite the camera (Back light)
(c-8)
Move the CONTROL dial up to raise the gain level.

When the gain level is too high
The picture may become distorted.

(c-9)



Setting Multiple Parameters

(c-9)

Example: To set the shutter speed to 1/250, aperture value to F4, and gain level to +6dB.

1 Set the AUTO LOCK switch down.

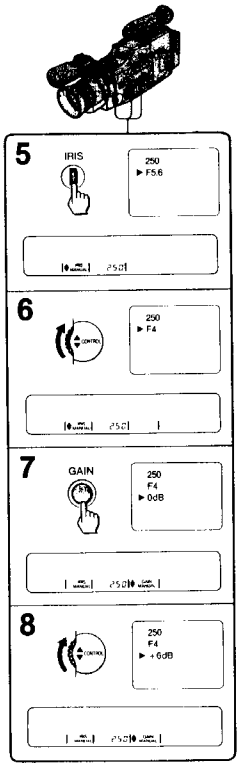
2 Press the PROGRAM AE button until nothing is indicated in the upper left hand corner of the viewfinder.
The camcorder enters the manual mode.

At this point, the shutter speed is set to 1/60, the aperture and gain are automatically adjusted to the shooting condition.

3 Press the SHUTTER SPEED button.

4 Move the CONTROL dial and set the shutter speed to 250.

Continued on the next page



5 Press the IRIS button.

6 Move the CONTROL dial and set the aperture value to F4.

7 Press the GAIN button.

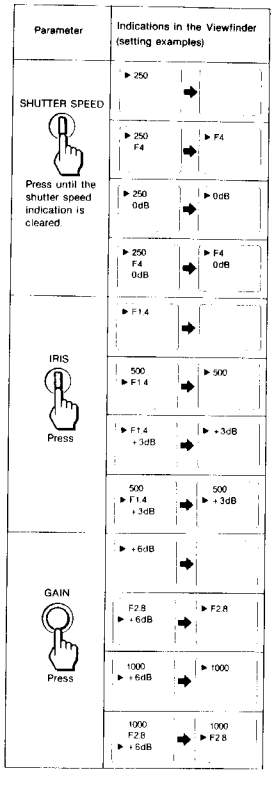
8 Move the CONTROL dial and set the gain level to +6dB.

Camera recording will be performed under this setting even when the shooting condition changes.

To return to the full automatic mode
Set the AUTO LOCK switch to AUTO LOCK.

What parameter to set first
Setting can be performed from any parameter. Press the button of the desired parameter. The indication when the button is pressed is the same as those explained in page 101.

(c-10)



To change the setting

- **Parameter with the ▶ indication:**
  Move the CONTROL dial to change the setting.
- **Parameter without the ▶ indication:**

1 Press the button of the desired parameter to move the ▶ indication to that parameter.

2 Then move the CONTROL dial to change the setting.

To quit the setting

(c-10)

Parameter with the ▶ indication:
Press the button of that parameter. The indication is erased from the viewfinder.

Parameter without the ▶ indication:

1 Press the button of the parameter to be erased to move the ▶ indication to that parameter.

2 Then press the same button to erase that parameter from the viewfinder.

When the parameter is erased
The adjustment of that parameter will be as follows.

- Shutter speed: Locked to 1/60.
- Aperture value: Automatic adjustment
- Gain level: Automatic adjustment. However, when the aperture value is in the viewfinder (i.e. locked to a certain value), gain will be set to the corresponding level to maintain the appropriate exposure.

(c-11)

	Aperture value	Shutter speed	Gain level
Selectable steps	16 steps	27 steps	8 steps
Variation of exposure (in terms of EV steps)	0.5 EV steps	0.25 EV steps	0.5 EV steps
		0.5 EV steps*	
Towards bright (+ EV) ↑	F1.4 ↑	1/60 ↑	+18 dB ↑
Towards dark (− EV)	F16	1/10000	−3 dB

*For shutter speeds between 1/4000 and 1/10000.

Advanced Application of the Manual Mode

The manual adjustment function offers an advanced video camera recording technique by controlling the exposure with the balance of shutter speed, aperture value and gain level.

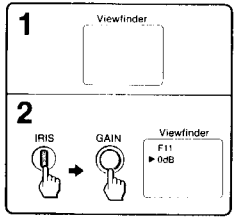
Understanding the relation between aperture value, shutter speed, and gain
Exposure is measured in the units of Exposure value (EV). In this camcorder, the total EV can be varied or kept at a constant level by controlling the balance of the parameters.

Refer to the chart on the left **(c-11)** for an overview of the relation between aperture value, shutter speed, and gain of this camcorder.

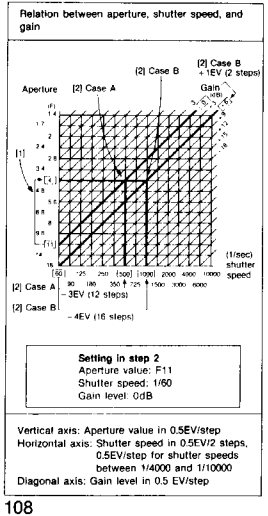
The relation between exposure and the aperture, shutter speed, and gain can be concluded as:

EV (Exposure value)	= Aperture control	+ Shutter speed control	+ Gain control

(c-12)



(c-13)


Relation between aperture, shutter speed, and gain
[2] Case B
[2] Case B + 1EV (2 steps)
Aperture
[2] Case A
Gain (dB)
(1/sec) shutter speed
[2] Case A
– 3EV (12 steps)
[2] Case B
– 4EV (16 steps)
Setting in step 2
Aperture value: F11
Shutter speed: 1/60
Gain level: 0dB
Vertical axis: Aperture value in 0.5EV/step
Horizontal axis: Shutter speed in 0.5EV/2 steps, 0.5EV/step for shutter speeds between 1/4000 and 1/10000
Diagonal axis: Gain level in 0.5 EV/step

Example: To change the setting without changing the exposure
(c-12)

1 Set the camcorder to the manual mode referring to page 104.

2 Press the IRIS and GAIN buttons.
At this point, the shutter speed is set to 1/60, the aperture and gain is set to the shooting condition. Let's suppose the aperture value is F11 and the gain level is 0 dB.

The setting at this point becomes the basic reference to perform the following setting.

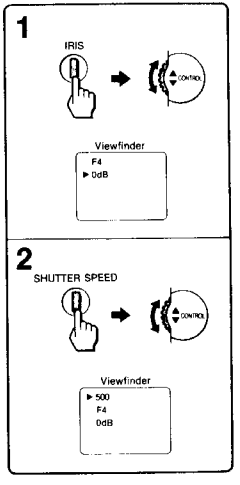
Let's set the exposure at this point at 0 EV.

0 EV =	Aperture control	+	Shutter speed control	+	Gain control

In order to maintain the same exposure, the total exposure should be kept to 0 EV in any case.

3 Refer to the diagram on the left (c-13) to choose the setting.

(c-14)



To set the aperture to F4 without changing the exposure
(c-14)

1 Press the IRIS button and move the CONTROL dial to set the aperture to F4.
When shifting the aperture from F11 to F4, the exposure becomes 6 steps brighter. This means that in terms of EV, the total exposure becomes +3 EV. In order to keep the total exposure to 0 EV, reduce the exposure by –3 EV with shutter speed or gain.

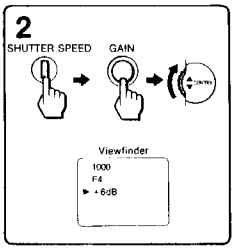
2 Case A: To reduce the exposure by shutter speed

How it works:
What is required here is to reduce the exposure by –3 EV, i.e.12 steps, by shifting the shutter speed from 1/60 to 1/500.

Operation:
Press the SHUTTER SPEED button and move the CONTROL dial to set the shutter speed to 1/500.

0 EV =	Aperture control	+	Shutter speed control
	F11 to F4	+	1/60 to 1/500
	+3 EV		–3 EV

Continued on the next page



Manual Mode

Case B: To keep the shutter speed at 1/1000 and to reduce the exposure by gain level.

How it works:

When setting the shutter speed to 1/1000, the total exposure is reduced to −4 EV. This means that +1 EV, i.e. 2 steps, should be added by controlling the gain level. Therefore, shift the gain level from 0 dB to +6 dB.

Operation:

Press the SHUTTER SPEED button twice and set the shutter speed to 1/1000. Then press GAIN and set the gain level to +6 dB.

	Aperture control		Shutter speed control		Gain control
0 EV =	F11 to F4	+	1/60 to 1/1000	+	0 dB to −6 dB
	+3 EV		−4 EV		+1 EV

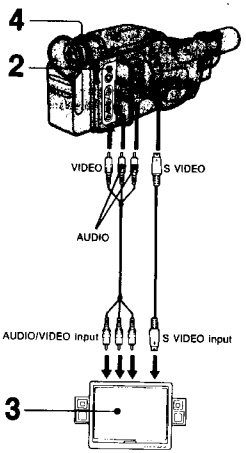
Hint for effective camera work

Gain can be used in terms of film sensitivity of a still camera.

Notes

- When shooting outdoors, the brightness of the object may change due to the change of weather.
- When the shooting condition changes, resetting of the parameters is recommended.

(d-1)



Custom Preset Function

The camcorder can be preset to record the picture with the desired contrast, color, sharpness, and hue. Adjust the camera, if necessary, after making several trial recordings.

Connections

(d-1)

When using the custom preset function, adjust the picture by shooting a subject and checking the picture on a TV or a monitor.

1 Connect the camcorder and the TV or monitor referring to the illustration.

2 Set the IN/OUT selector to OUT.

3 Set the TV/VTR selector on the TV or monitor to VTR.

4 Press DATA SCREEN to display the CUSTOM PRESET menu indication in the viewfinder on the TV or monitor screen.

Understanding the setting in the CUSTOM PRESET menu

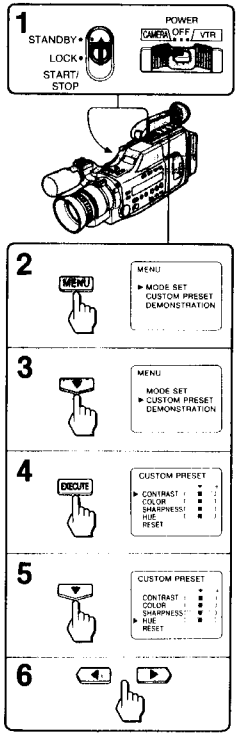
The custom preset function is effective only when the tape recorded in the CUSTOM PRESET mode is viewed on the TV or monitor that was connected to the camcorder at the time of the setting.

Therefore, the tape may not reproduce the picture in the expected contrast, color sharpness, or hue, when played back on a different TV or monitor.

Note

Refer to the operating instructions of the TV.

(d-2)



Operation

(d-2)

1 Set the POWER switch to CAMERA and slide the STANDBY switch up.
The camcorder enters the recording standby mode.
In order to adjust the picture precisely, adjust the focus and white balance manually.

2 Press MENU.

3 Press ▼ and move cursor to CUSTOM PRESET.

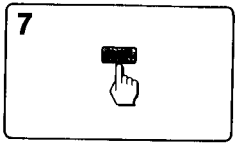
4 Press EXECUTE.
The CUSTOM PRESET menu is displayed.

5 Press ▼ and move cursor to the item to be adjusted.
Each press of ▼ moves the cursor to the item below. When the cursor is at RESET, press ▼ again to move the cursor to CONTRAST.

6 Press ◀ or ▶ to adjust the picture shot by the camera by monitoring it on the TV or monitor screen.
Three steps each from the standard position can be selected.

Parameter	Function	◀– ▼ +▶
CONTRAST	To adjust the brightness	Darker Brighter
COLOR	To adjust the color intensity	Lighter Darker
SHARPNESS	To sharpen the outline	Softer Sharper
HUE	To adjust the hue	Purplish Greenish

Continued on the next page



7 Check the cursor is not set to RESET and press EXECUTE.
The CUSTOM PRESET menu is cleared and the new setting is stored in the memory.

To record in the setting made in the CUSTOM PRESET menu

1 Set the camcorder in the recording pause mode.

2 Call up the MODE SET menu referring to page 61.

3 Select "CUSTOM MODE ON".

4 Press EXECUTE.

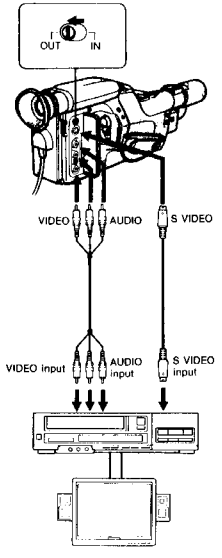
5 Set the AUTO LOCK switch down.

6 Press START/STOP to start recording.

To return to the standard setting
Set cursor to RESET in step 7 of "Operation and press EXECUTE".
The CUSTOM PRESET menu is cleared. All of the parameters will be at the standard position the next time it is called up.

Note
The effect of the CUSTOM PRESET function may not be apparent depending upon the brightness, pattern, and color of the subject.

(e)



Editing onto Another VCR

You can create your own video program by editing with any other 8 mm, Betamax, or VHS format VCR.

Before You Begin

(e)

- Make connections using the supplied A/V connecting cable for stereo equipment. For monaural equipment, connect only the white plug for audio.
- Use of the supplied AC power adaptor is recommended.
- Set the IN/OUT selector on the camcorder to OUT.
- Select "EDIT ON" in the MODE SET menu. See page 59.
- Press DATA SCREEN to clear the indication from the viewfinder. Otherwise, the indication will be recorded together with the picture on the recording VCR.
- Set the input selector of the VCR to LINE, if available.

Operation

1 **Insert a tape for recording into the recording VCR.**

2 **Set the POWER switch on the camcorder to VTR and insert a source tape.**

3 **Playback the tape on the camcorder and locate the editing start point. Then set the camcorder to the playback pause mode.**

4 **Playback the tape on the recording VCR and locate the recording start point. Then set the VCR to the recording pause mode.**

5 **Release the pause mode on both VCRs.**
Editing starts.

To stop editing momentarily
Press ❚❚ on the recording VCR.

To edit more scenes
Repeat steps 3 to 5.

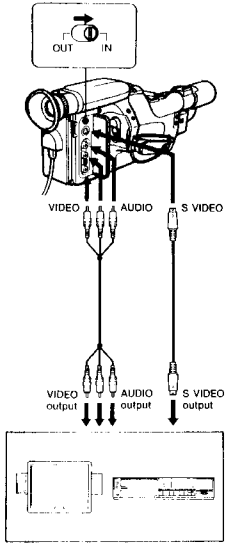
To stop editing
Press ■ on both VCR.

To record a title
Use the camcorder as a player. Playback the tape and call up the title in the desired mode. The played back picture will be recorded on the recording VCR with the title superimposed. For details on the title, refer to pages 75 to 84.

Notes on edit function
When using the camcorder as the playback VCR, selecting the "EDIT ON" in the MODE SET menu activates the edit function. Picture deterioration resulting from editing can be kept to the minimum. However, avoid using the edited tape for multiple generations of editing.
Deactivate the edit function when not editing.

Recording from Another VCR or a TV

(f)



You can record a TV program from the TV, or a tape played back on another VCR that is equipped with audio/video outputs.

Before You Begin

(f)

- Make connections using the supplied A/V connecting cable for stereo equipment. For monaural equipment, connect only the white plug for audio.
- Set the IN/OUT selector on the camcorder to IN.

Operation

1 Turn on the TV or VCR.

2 Select the TV channel or play back the tape to be recorded.

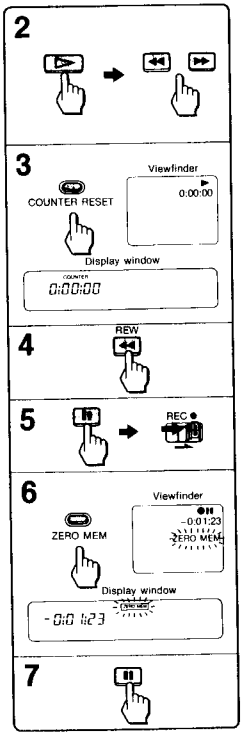
3 Set the POWER switch on the camcorder to VTR.

4 Insert a tape and slide ● REC.
Recording starts.
The picture being recorded can be monitored in the viewfinder as well as on the TV screen.

What to choose for Hi8 recording
Select "Hi8 AUTO" in the MODE SET menu.
Recording in the Hi8 mode will be performed when a Hi8 tape is used. When a standard tape is used, recording is performed in the normal mode.

Notes on connection
- When the TV or the playback VCR is monaural, make connection only to the L jack. Recording will be made in monaural.
- When connection is made both to the VIDEO jack and the S VIDEO jack, the video signal fed from the S VIDEO jack has priority.

(g)



Insert Recording

You can insert new scenes from a TV or a VCR onto your originally recorded tape.

Before You Begin

- Make the same connection explained in "Recording from Another VCR or a TV" page 116.
- Set the IN/OUT selector on the camcorder to IN.

Operation

(g)

1 Follow steps 1 to 3 in "Recording from Another VCR or a TV – Operation".

2 Play back the tape in the camcorder and locate the point where the insert should end by pressing ⏩ or ⏪.

3 Press COUNTER RESET at the end point.
The counter is reset to "0:00:00".

4 Rewind the tape in the camcorder and locate the point where the insert should begin.

5 Set the camcorder to the recording pause mode at the insert start point.

6 Press ZERO MEM.
The insert end point is stored in the memory as the "0:00:00" point.

7 Release the pause mode of both units.
Insert recording will start.
The picture being recorded can be monitored in the viewfinder as well as on the TV screen.

8 The insert recording will stop automatically around the counter zero point.

To change the end point of the edit
Press ZERO MEM so that the ZERO MEM indication disappears. Start from step 2.

Notes and Precautions

Notes on Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camcorder, on the surface or the tape, or on the lens. In this condition, the tape may stick to the head drum and be damaged or the unit may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors.
However, take the following precautions.

(h-1)

If moisture condenses inside the unit
(h-1)
Moisture is present inside the camcorder when the 💧 and ⏏ indication in the viewfinder blinks. In this case, no function except for tape ejection will work.
Eject the tape, turn off the camcorder, and leave it with the cassette holder open for at least 1 hour.
The camcorder can be used again if the 💧 and ⏏ indication does not appear when the power is turned on again. (⏏ indication appears only when a tape is inserted.)

(h-2)

If moisture condenses on the surface of the tape
(h-2)
If moisture is present on the surface of the tape when the tape is inserted and a tape transport button (▷, ◀◀, etc.) is pressed, the ⏏ indication blinks inside the viewfinder. In such case, no function except for tape ejection will work.
Eject the tape and let it sit for at least 1 hour.
The tape can be used again if the ⏏ indication does not appear when the tape is inserted and a tape transport button is pressed.

If moisture condenses on the lens
No caution indications, will appear, but the picture becomes dim.
Turn off the power and leave the camcorder unused for at least 1 hour.

(h-3)

Notes on Video Head Cleaning

To ensure clear picture, clean the video heads periodically.
When playback, pictures are noisy or hardly visible, the video heads may be contaminated.
(h-3)
[a] Slight contamination
[b] Critical contamination
In such cases,

1 **Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied), referring to its instructions.**

2 **After cleaning, check if the picture is clear by recording or playing back with an ordinary tape.**

3 **If the picture is still noisy, repeat cleaning. (Do not repeat cleaning more than 5 times).**

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Note
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

Precautions

On operation

- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor), or 9.0 V (alkaline batteries).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not hold the camcorder by the viewfinder or the microphone.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camera.
- Do not wrap the camcorder and operate it because heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- Do not put the camcorder on the sand.

On care

- When the unit will not be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera section and player section and play back a tape for about 3 minutes.
- Clean the lens with a soft brush to remove dust. If there are fingerprints on it, wipe them off with a soft cloth.
  Clean the camcorder body with a dry, soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Note on copyright
Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Using Your Camcorder Abroad

Each country has its own electricity system and TV color system. Before using your camcorder abroad, check the following points.

Power Sources

You can use your camcorder in any country with the supplied AC power adaptor within 110 V to 240 V AC, 50/60Hz.

Difference in Color Systems

You can view the playback picture in the viewfinder. However, if you want to view the playback picture on a TV, it must be a NTSC system-based TV.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, The Philippines, U.S.A., Venezuela, etc.

PAL system countries
Argentina, Australia, Austria, Belgium, Brazil, China, Denmark, Finland, Great Britain, Holland, Hong Kong, Italy, Kuwait, New Zealand, Norway, Paraguay, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, Urguay, West Germany, etc.

SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, Soviet Union, etc.

Specifications

System

Video recording system	Rotary two heads Helical scanning FM system
Audio recording system	Rotary head, FM system (2 channels)
Video signal	NTSC color, EIA standards
Usable cassette	8 mm video format cassettes
Tape speeds	SP mode: Approx. 1.43 mm/sec. (1/16 inch/sec.) LP mode: Approx. 0.72 mm/sec. (1/32 inch/sec.) (playback only)
Recording time	SP mode: 2 hours (E6/P6 – 120)
Playback time	SP mode: 2 hours (E6/P6 – 120) LP mode: 4 hours (E6/P6 – 120)
Fastforward/rewind time	Approx. 7 min. (E6/P6 – 120)
Image device	CCD (Charge Coupled Device)
Viewfinder	Electronic viewfinder (Black and white)
Lens	Combined 8 × power zoom lens f = 8.5 to 68 mm, F1.4 with macro Filter diameter 46 mm
Auto focus system	TTL
Color temperature	Auto, one push white balance, 3,200 K 5,800 K
Minimum illumination	3 lux (F1.4)
Illumination range	3 lux to 100,000 lux (0.3 to 9,294 footcandles)
Recommended illumination	More than 100 lux (9.3 footcandles)
Shutter speed control	1/60 to 1/10000 (27 steps)
Aperture control	Auto/manual (16 steps)
Gain control	Auto/manual (8 steps)

Input and Output Connectors

Video input/output	Phono jack, 1 Vp-p, 75 ohms unbalanced, sync negative
S video input/ouput	4-pin mini-DIN Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative Chrominance signal: 0.286 Vp-p 75 ohms, unbalanced
Audio input	Phono jacks (2: stereo L and R), −7.5 dBs Input impedance more than 47 kilohms
Audio output	Phono jacks (2: stereo L and R), −7.5 dBs at 47 kilohms Input impedance Impedance less than 1 kilohm
RFU DC OUT	Special mini jack, 5 V DC
Headphones jack	Stereo mini jack, 8-ohm impedance
REMOTE jack	Stereo mini-mini jack
Microphone jack	External stereo microphone jack: mini jack, −66 dBs low impedance with 2.5 to 3 V DC, output impedance 6.8 kilohms
Microphone power output jack	Special mini jack, 5 V DC

General

Power requirements	On battery mounting surface 6.0 V (battery pack), 7.5 V (AC power adaptor), 9.0 V (alkaline batteries)
Power consumption	6.7 W (camera recording, including the viewfinder)
Installation	Vertically, horizontally
Operating temperature	0° C to 40° C (32° F to 104° F)
Storage temperature	−20° C to 60° C (−4° F to +140° F)
Dimensions	Approx. 105 × 137 × 341 mm (w/h/d) (4 1/4 × 5 1/2 × 13 1/2 inches)
Weight	Approx. 1.2 kg (2 lb. 10 oz.) excluding the battery and the cassette
Microphone	Electret condensor microphone Uni-directional, stereo type
Accessories supplied	See page 4.

Design and specifications subject to change without notice.

Trouble Indications

If an indication blinks in the viewfinder screen or a caution lamp on the main unit blinks, check the following table.

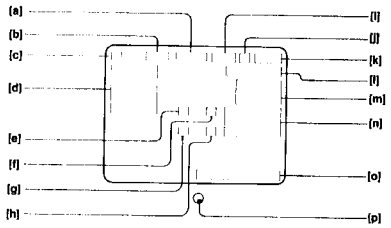
slow blinking fast blinking

	Symptom	Cause	Corrective actions
Camera/ VTR	, Tally lamp	The battery is weak.	Prepare a charged one.
	, Tally lamp	The battery is used up.	Use a charged battery.
Camera	, Tally lamp	The tape is at its end.	Use a new tape.
	, Tally lamp	The tape is near its end.	Prepare a new one.
		No tape is inserted.	Insert a tape.
		The tab on the tape is out (red).	Slide the tab.
		The white balance has not been set correctly.	Adjust the white balance correctly.
		White balance is being set by the one push white balance function.	Do not move the unit until the blinking stops.
	▶	Exposure is not appropriate in the aperture priority or shutter priority mode.	Adjust the aperture or shutter speed to obtain the appropriate exposure.
Camera/ VTR		Moisture condensation has occurred. (indication appears only when a tape is inserted.)	Remove the tape and leave the recorder for at least an hour.
		Video head clogging.	Clean the head using the Sony V8-25CLH video head cleaning tape.
		Other troubles occurred.	Consult your nearest Sony dealer.
	"AM 12:00:00" blinks for 5 seconds in the viewfinder after setting the POWER switch to CAMERA. In the display window "0:00:00" or bar indication blinks.	The lithium battery is not installed. The lithium battery is exhausted.	Install the lithium battery.
	The current time blinks for 5 seconds in the viewfinder after setting the POWER switch to CAMERA. In the display window the counter, date/time indication blinks.	The lithium battery is weak.	Use a new battery.

Indications in the Viewfinder and the Display Window

Indications in the Viewfinder

(i-1)



(i-1)

[a] Custom mode indication

[b] Macro mode indication

[c] White balance mode indication

[d] Fader and programmed AE indication

[e] Battery indication

[f] Tape indication

[g] Moisture condensation indication

[h] Head clog and caution indication

[i] Hi8 mode indication

[j] LP mode indication

[k] Tape operation mode, camera operation mode indication

[l] Tape counter indication

[m] Title number, color, and mode indication

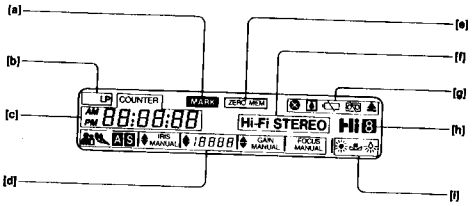
[n] Index operation and zero memory mode indication

[o] Date and time

[p] Camera recording lamp

Indications in the Display Window

(i-2)



(i-2)

[a] Index mark indication

[b] Tape speed indication

[c] Time, date, and tape counter indication

[d] Programmed AE and manual mode indications

[e] Zero memory mode indication

[f] Hi-fi stereo mode indication

[g] Caution indication

[h] Hi8 mode indication

[i] White balance mode indication

Trouble Checks

If you think you have a problem, double-check before calling the serviceman.
You may have overlooked something relatively simple!

Symptom	Cause	Procedure
The power will not turn on.	The battery is not attached.	Attach the battery.
	The battery is exhausted.	Use a new battery.
	The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.
The START/STOP button does not operate.	The tape is affixed to the drum.	Remove the cassette with the EJECT button.
	The tape is at its end.	Rewind the tape or use a new one.
	The POWER switch is set to VTR.	Set it to CAMERA.
	The tab on the cassette is out (red).	Use a new cassette or slide the tab.
The tape does not move when a tape transport button is pressed.	POWER switch is set to CAMERA or OFF.	Set it to VTR.
	The tape is at its end.	Rewind the tape or use a new one.
The power turns off.	While being operated in the CAMERA mode, the recorder has been in the pause mode for more than 5 minutes.	Slide down the STANDBY switch, and slide it up again.
	The battery is exhausted.	Use a charged battery.
A vertical band appears when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high; the camera is not malfunctioning.	—
The battery pack is quickly discharged.	The ambient temperature is too low.	—
	The battery pack has not been charged fully.	Charge the battery pack again.
The cassette cannot be removed from the compartment.	The battery is exhausted.	Use the charged battery or the AC power adaptor.
Automatic focus does not function.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	The camcorder is in the macro mode.	Auto focus does not function in the macro mode. Adjust the focus manually.
	Shooting condition is not suited for automatic focusing. (See page 62.)	Adjust the focus manually. (See page 64).
The color of the playback is not appropriate.	The AUTO LOCK switch is not set to AUTO LOCK.	Set the AUTO LOCK switch to AUTO LOCK.
	Shooting condition is not suitable for auto white balance operation. (See page 66.)	Set the AUTO LOCK switch down and adjust the white balance manually. (See page 67.)
The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.
	Moisture has condensed on the lens.	Turn off the power and leave the camcorder unused for at least 1 hour.
The playback picture is not clear.	"EDIT ON" is selected in the MODE SET menu.	Select "EDIT OFF" to deactivate the edit function.
	The channel for the VCR is not adjusted on the TV.	Adjust the TV.

Symptom	Cause	Procedure
The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH video head cleaning cassette. For details on cleaning, refer to the instructions furnished with the cleaning cassette. If the cleaning cassette is not available in your area, have the heads cleaned at the nearest Sony service facility.
No function except for cassette ejection works.	Moisture condensation has occurred. (See page 118.)	Remove the cassette and leave the unit for at least an hour.
The auto white balance function does not work.	• The AUTO LOCK switch is not set to AUTO LOCK. • Shooting condition are not suitable for auto white balance operation.	• Set the AUTO LOCK switch to AUTO LOCK. • Adjust the white balance manually. (See page 67.)
The indication in the viewfinder is blinking.	No lithium battery installed.	Install a lithium battery.
	The lithium battery is exhausted.	Use a new battery.
No sound or only a low sound is heard when playing back a tape.	The stereo tape is played back with the camcorder set to "HIFI SOUND [1] or [2]."	Select "HIFI SOUND STEREO" in the MODE SET menu. (See page 59.)
Nothing can be viewed except for a black screen in the viewfinder.	The power of the camcorder was turned off with the aperture closed.	Open the aperture in the manual mode. (See page 99.)